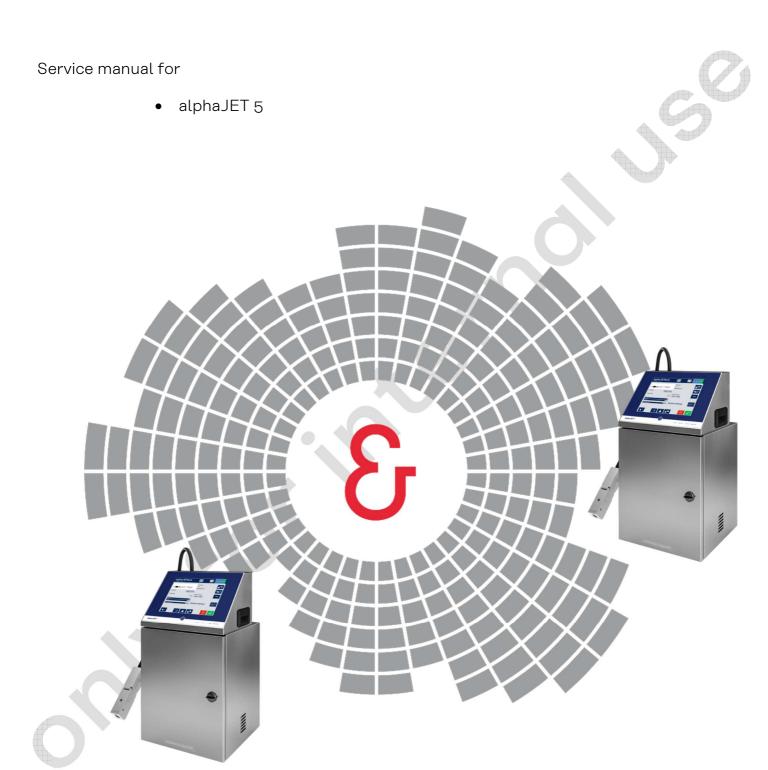
Coding Service Manual

Service manual



Coding Service Manual

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1. Safety regulations

Product safety

The machine complies with the state of the art and the recognized rules of safety engineering. Any potential hazards existing in connection with the specific design and construction of the machine are reduced to an acceptable degree. This requires, however, that all safety regulations, and particularly those applying to the particular unit, are complied with.

The type and scope of these product-specific safety regulations are based on a risk analysis.

It is the operator's duty to make sure that the unit is put into operation only when it is in technically perfect condition.

1.1 Standards and directives

Applied directives	
2011/65/EU	Directive 2011/65/EU of the European Parliament and of the Council from 8 June 2011 on the limitation of use of certain dangerous materials in electric and electronic devices.

Table 1: Applied directives

Applied directives	
DIN EN 62368-1:2016-05 + A11:2017-11	Modifications for audio/video, information and communication technology – Part 1: Safety requirements
DIN EN IEC 63000:2019-05:	Technical documentation for evaluating electronic and electric devices for the restriction of hazardous materials
DIN EN 300330:2017-05	Short Range Devices (SRD) – Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz – Harmonised Standard covering the essential requirements of Article 3.2 of the Directive 2014/53/EU
DIN EN 301489-1:2020-06	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services – Part 1: Common technical requirements – Harmonised Standard for ElectroMagnetic Compatibility
DIN EN 301489-3:2019-08	ElectroMagnetic Compatibility standard for radio equipment and services – Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz – Harmonised standard covering the essential requirements of Article 3.1(b) of Directive 2014/53/EU

Table 2: Applied directives

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1.2 FCC conformity

USA

The CCM10404715 has been tested to FCC 15.209 radiated limits for a Class A digital device. The CCM10404715 will be installed within the printer which is tested as a Class A digital device.

This device complies with Part 15 of the FCC Rules. Operating is subject to the following two conditions:

- 1. This device may not cause interference, and
- 2. This device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Figure 1: FCC conformity

USA

The CCM10404715 has been tested to FCC 15.209 radiated limits for a Class A digital device. The CCM10404715 will be installed within the printer which is tested as a Class A digital device.

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Coding Service Manual

1.3 Presentation of safety information

The safety information in this document is marked with safety symbols and is presented in line with the SAFE principle. It contains information on the type and source of the risk, possible consequences and avoidance of risk.



DANGER

Warns against an accident that will occur if the instructions are not followed. The accident leads to serious, possibly life-threatening injuries or death, e.g. by touching electrical units under high voltage.



WARNING

Warns against an accident that can occur if the instructions are not followed. The accident can lead to serious, possibly life-threatening injuries or death, e.g. by touching electrical units under high voltage.



CAUTION

Warns against an accident that can occur if the instructions are not followed. The accident can lead to minor injuries, e.g., burns, skin problems or crushing.



ATTENTION

Warns against possible property damage



NOTE

Important general note



NOTE

Important note on env. protection

1.4 Symbols used

Symbol	Meaning
A	Danger from electrical voltage; electric shock
	Danger from handling flammable materials
7	Cross-reference "see Section "xx", page "yy"
\rightarrow	Result
>	Next step
0	Bullet points

Table 3: Symbols used

Coding Service Manual

1.5 Type plate

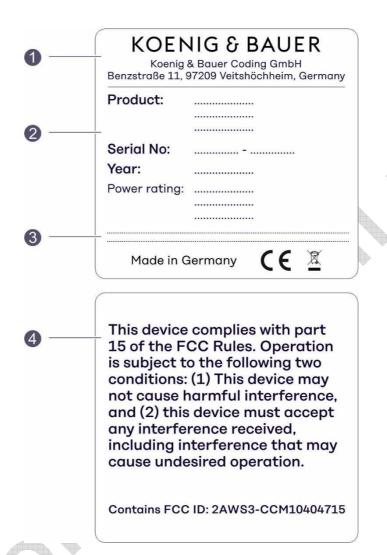


Figure 2: Type plate

- 1 Manufacturer information
- 3 Additional information (product-dependent)
- 2 Product information
- 4 FCC conformity

Coding Service Manual

1.6 General safety information



DANGER

Danger of death or serious injury from electric shocks.

- Before working on the electrical equipment always turn the device off and remove the plug!
- Secure it from being inadvertently switched back on.
- In case of emergency: Immediately de-energise the system.
- Protect the system against being turned on again.
- Some electronic components retain a voltage even when the device's main switch is turned off!



DANGER

Risk of fire due to inflammable substances! Serious damage to health due to burns possible!

- Do not smoke in the area where the device is installed!
- Never operate the device near sources of fire such as open flames, intense heat or equipment that generates sparks.
- Always keep the print head of the device away from any vessels that contain inflammable liquids, particularly when the machine is switched on.
- Operation of the device is only permitted in well ventilated rooms.
- Never store large amounts of operating resources near the place where the device is installed.
- Only store as much ink and/or solvent within the area of the workplace as is required for one working day.
- Ensure that rooms where inks are stored are provided with an adequate ventilation system.
- Appropriate measures must be taken to protect the machine from static discharges which might occur in the proximity of the operating materials or the print head.



DANGER

If irritant and sensitising consumables are swallowed, inhaled or come into contact with the skin, there is a risk to your health!

- Do not swallow ink or solvent!
- Avoid contact with the eyes and skin.
- Avoid inhaling ink and solvent vapours! Ensure sufficient ventilation and exhaust.
- Always wear suitable personal protective equipment (protective goggles, protective gloves) when working on the print head!
 - Observe the information in the safety data sheets.
 - Contact a doctor if you feel unwell or nauseous or if you vomit.



WARNING

Risk of injury through slipping!

• Immediately remove any dirt or contamination, e.g., liquids that may have spilled on the floor.



ATTENTION

Risk of damage to the device or individual components!

Do not carry out any unsupervised test runs or print processes when the high voltage supply is activated.



ATTENTION

Risk of damage to the device or individual components!

• Never dip the print head in solvent.

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ATTENTION

The device may cause radio interference in residential areas.

• The device may only be stored in industrial areas.



ATTENTION

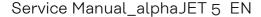
Risk of damage to the touch screen!

- Do not operate the touch screen with points or sharp objects.
- Only press each button with the finger until the button display shows the "pressed" state.
- Only press the relevant button once in order to trigger an operator command. Exception: A prompt to press a button several times or to keep it pressed.
- Only press the touch screen lightly.
- Keep the touch screen clean. Wipe regularly with a dry cloth.

The device is only suitable for inks, solvents and cleaning agents that have been approved for use by Koenig & Bauer Coding GmbH.

When using approved equipment and cleaning agents, the following rules of conduct and protective measures must be observed:

- Operation of the device is only permitted in well ventilated rooms.
- Avoid printing inks and solvents entering the body through skin contact, swallowing or inhaling solvent vapours.
- In order to avoid an impermissible increase of the solvent concentration in the device housing:
 - Check that the lids on the ink and solvent bottles are tight,
 - Visually inspect the ink system regularly for leaks.
 - ¬ The device is equipped with a monitored ventilation circuit that switches off the device in case of fan failure.
- Always disconnect the power plug from the mains before you begin to work!
- Do not eat, drink or smoke in the area where the device is installed.
- Install a CO₂ fire extinguisher within a well accessible radius of 10 metres of the device.



Coding Service Manual

1.6.1 Danger zones

The working area around the device is defined as a danger zone. The operator must ensure safe installation and use of the device.



WARNING

Risk of injury through unauthorised access to the working area around the device!

• Only authorised persons are permitted to stay within the working area around the device



WARNING

Risk of injury due to obstructed workplace!

- Do not leave any objects and materials in the workplace area.
- Do not obstruct the workplace.

1.7 Safety information for set-up/assembly



DANGER

Danger of death or serious injury from electric shocks.

- Only trained electricians are authorised to install electrical equipment on the device.
- The electrical supply must be installed properly and all safety regulations taken into account.



WARNING

Risk of injury through improper transport!

- Only trained personal are authorised to load and transport the device.
- When transporting, only use appropriate and reliable equipment and devices (e.g. lift truck, fork lift truck, crane, load sling rope, etc.). Note the load carrying capacity of the equipment and devices.
- Check that the load is resting securely and the weight is balanced during transport, especially before lifting.



ATTENTION

Damage to the device through improper storage!

- The device should only be stored upright and in the original packaging.
- Protect device from moisture during storage (max. air humidity: 90% relative air humidity, non-condensing).
- The device should be stored at constant climatic conditions (max. temperature range: +5°C to +40°C).

1.8 Safety information for commissioning

- The device may only be operated if it is in a technically flawless state.
- Check that all doors and covers are mounted and operable.
- Check that only authorized persons are present within the working area around the device.
- Check device for visible damage.
- Report any defects and noises out of the ordinary, e.g., unusual noises, smells, vibrations, etc., to the supervisor immediately.
- Make sure there is sufficient space around the ventilation openings of the device to guarantee the unobstructed flow of air to and from the device (minimum distance to all cooling air inlets and outlets of the device: 10 cm).

Coding Service Manual

1.9 Safety instructions for normal operation



WARNING

Risk of injury through unauthorised and improper use of the device!

- Only trained and authorised skilled personnel are permitted to use the device.
- The contents of this operating manual must be understood and adhered to.



ATTENTION

Potential damage to the device related to automatic power on!

Ensure that the device is not in STAND BY mode before intervening in the ink system. In STAND BY mode, the device is switched on automatically at regular intervals in order to start the Ink Service function.



ATTENTION

Risk of damage to the touch screen!

- Do not operate the touch screen with points or sharp objects.
- Only press each button with the finger until the button display shows the "pressed" state.
- Only press the relevant button once in order to trigger an operator command. Exception: A prompt to press a button several times or to keep it pressed.
- Only press the touch screen lightly.
- Keep the touch screen clean. Wipe regularly with a dry cloth.

1.10 Safety information for service and maintenance



DANGER

Danger of death or serious injury from electric shocks.

- Only trained electricians are authorised to service and maintain the electrical equipment on the device.
- Before working on the electrical equipment always turn the device off and remove the plug!
- Secure it from being inadvertently switched back on.
- In case of emergency: Immediately de-energise the system.
- Protect the system against being turned on again.
- Some electronic components retain a voltage even when the device's main switch is turned off!



WARNING

Risk of injury through unauthorised and improper service and maintenance of the device!

- Only trained and authorised skilled personnel are permitted to maintain and service the device.
- The contents of this operating manual must be understood and adhered to.



CAUTION

Risk of injury though unauthorised or improper handling of the print head!

• Only trained and skilled authorised personnel are permitted to clean the device and the print head.



Coding Service Manual

- Please observe the maintenance and repair instructions for the various individual components in this operating manual.
 - Before starting maintenance and repair work:
 - ¬ Switch off the device,
 - ¬ Switch off the power supply at the main switch,
 - ¬ Separate the device from the power supply (disconnect the power plug),
 - ¬ Depressurise the compressed air supply.
 - The following tasks should be performed by trained electricians on a regular basis:
 - Check the electrical equipment,
 - ¬ Tighten loose connections,
 - ¬ Exchange damaged wiring and cables immediately.

1.11 Safety and monitoring devices

1.11.1 Operator terminal



Figure 3: Safety and monitoring devices, operator terminal

- 1 Info messages
- 3 ERROR signal lamp
- 5 READY signal lamp

- 2 Consumables signal lamp
- 4 SERVICE signal lamp

1.11.2 Signal tower (optional)

In order to determine the current operating status of the device as well as fault and warning messages from a greater distance, it is possible to use a signal tower

Coding Service Manual

1.12 Operator duties

In practice, this operational reliability can only be reached if all necessary measures are taken. It is subject to the care of the operator of this device to plan these measures and to control their actual enforcement.

The operator must ensure that...

- The recognized rules for occupational safety are observed and complied with.
- The device is used only as intended.
- The device is only operated when in a faultless and functioning state.
- The safety devices will be checked for proper functioning at regular intervals.
- All necessary safety equipment (e.g. safety gloves, protective goggles) required by operating, maintenance and repair personnel is available and is made use of.
- This operating manual is always complete and legible and, in that state, available at the place of use of the device.
- Only qualified and authorized personnel operate, maintain and repair the device.
- These personnel are instructed on occupational safety and environmental protection at regular intervals, as required by law.
- These personnel are familiar with the contents of the operating manual, especially with the safety instructions it contains.
- All safety instructions and warnings attached to the marking system are always legible, are never covered and are never removed.
- No changes or modifications to the device and its control systems are made.

1.13 Requirements to be met by personnel

- The device may only be operated by persons who are appropriately trained, instructed and authorized to do so.
- All persons working on or at the device must thoroughly read and understand this operating manual before starting work.
- It is advisable for the operators to have this confirmed by providing their personal signature.
- Personnel, who are to be trained, must only work with the unit if supervised by a person who is acquainted with the unit. Both trainer and trainee should receive a written confirmation certifying that the training course has been completed successfully.
- Recognized rules for occupational safety must be complied with.
- Operating staff are obliged to immediately inform their superiors of any malfunctions or damage to the machine.
- The respective competencies of the operating staff must be clearly defined.

1.14 Additional information

Only original Koenig & Bauer Coding inks, cleaning agents, cleaning tissues and rinsing fluids may be used. If other operating materials are used, we accept no liability for any direct or indirect damage to the machine or its environment.

Coding Service Manual

1.15 Safety signs

- Note safety information for normal operation
 (Section 0 1.9 Safety instructions for normal operation, p. 13)
- Each time before turning on the device, check and verify whether:
- ¬ All doors and covers are mounted and operable. The device's danger zones are safely covered by the safety devices.
- ¬ Only authorised persons are present within the working area around the device.
- ¬ A check for visible damage is performed.
- Anything out of the ordinary, e.g., unusual noises or vibrations, etc., is immediately reported to the supervisor.
- ¬ The device is only operated when in a technically faultless state.



CAUTION

Automatic print head cleaning

Risk of injury, e.g., to eyes, though unauthorised or improper handling of the print head!

- Protective glasses must always be worn when handling the print head!
- The print head must always be located in the print position or a cleaning/maintenance position during the cleaning cycle as solvent can spray out of the inkjet outlet opening unexpectedly.
- Under no circumstances may the print head be held in the hand, with the operator looking directly into the inkjet outlet opening.
- Similarly, under no circumstances should the operator look directly into the inkjet outlet opening during the print process. This could result in ink or solvent being sprayed into the eyes.

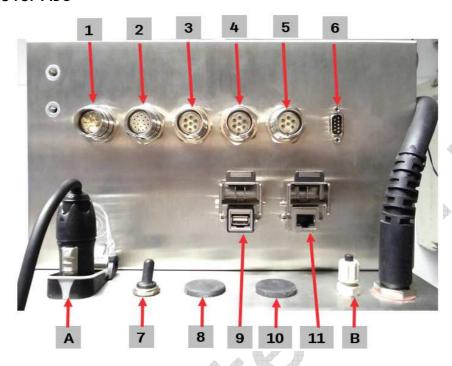




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2. Component overview

2.1 Connections for AJ5



Α	Mains power supply	6	connection Serial RS-232 COM1
В	Compressed air max. 0.2 bar (6/4mm, optional)	7	Main switch
1	Alarm output	8	Signal stack (status indicator optional)
2	I/O-socket (16-pole)	9	USB port USB 2.0
3	Product sensor / Encoder	10	connection Serial RS-232 COM2
4	Product sensor / Encoder	11	Network connection RJ-45 100 BASE-T
5	Remote connection		

2.1.1 Electrical data for the power supply

Electrical Data		
Supply voltage AC	110 to 230 [V] (± 10%)	
Power frequency	50 / 60 [Hz]	
Current consumption	Max. 0.5 [A] / 230 [V]	Max. 1.0 [A] / 110 [V]
Power cable (length)	4 [m]	

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2.2 Remote socket

Socket with assignment				
	1	+IN		
6 5	2	- IN		

Technical data		
Input voltage (+IN -IN): (reverse polarity protected)	24 V ± 20%	
Input current:	6 to 9 mA	

Time diagram

The following control sequences for the REMOTE signal are required for remote control of the machine.

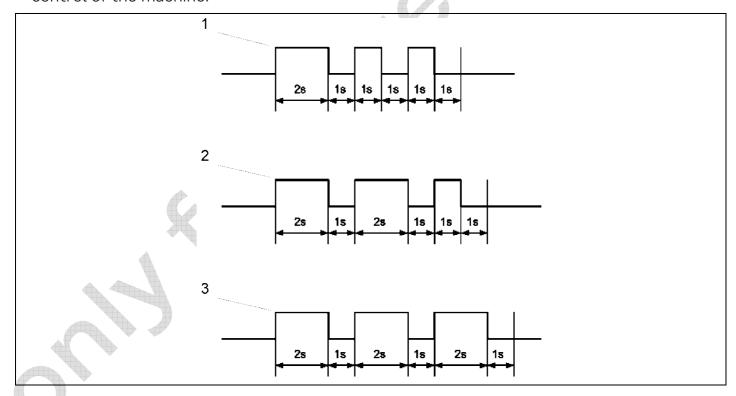


Figure 1 : Remote socket time diagram

1	Start in Print ready mode
2	Start in Service mode
3	Shutting down

Coding Service Manual

2.3 Product sensor- / encoder socket

Pin assignment of a product sensor / encoder socket				
	1	GND (software switchover,		
	2	external/internal)		
	3	Encoder channel A		
	4	VCC (software switchover		
	5	extern/intern)		
3 SO	6	Product sensor input		
	7	Encoder channel B		
	Housing	Line shield		

- The machine is provided with two parallel sockets for the connection of product sensors and encoders.
- It makes no difference to which of the two sockets the product sensor or the encoder is connected. Thus, it is also possible to forward the signals from one machine to the next (pay attention to the driver output of the sensors).

ATTENTION



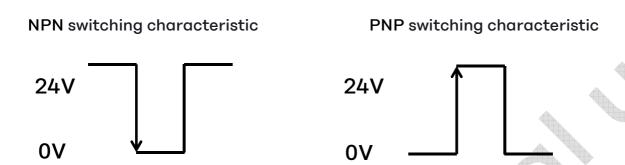
To ensure trouble-free operation of the machine, it is vital to use shielded cables for the encoder / product sensor in order to prevent interference signals from developing.

If it is not possible to use shielded cables for the product sensor, the ground connector used must be connected to the connector housing.

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Product sensor

The product sensor supplies the initiate printing signal to the printer. Product sensors with either NPN switching characteristics (active at 0 V) or PNP switching characteristics (active at 24 V) may be connected to the machine. Using software, the input on the printer can be switched to the respective characteristic: PNP or NPN.



It is thus no longer necessary to have a diode at a push-pull output stage.

Both DC-coupled and DC-decoupled operation is possible for the product sensor input. This can also be switched using software.

In the DC-coupled operating mode, the task of supplying the sensor is assumed by the machine. In the DC-decoupled operating mode, the product sensor and the input stage of the machine are supplied with line voltage by an external system. This may be required if, for example, the product sensor signal originates from a PLC (programmable logic controller) or if several machines "share" the product sensor (packaging machine + alphaJET, several alphaJET printers).

DC-coupled mode:

- The signal output of the connected sensor must be able to drive a load current of min. 20 mA. The signal input at the printer requires a minimum current of 20 mA, or a floating state.
- The correct mode of operation must be set at the printer.

Technical data		
VCC (+UB internal – GND internal)	24 V ± 5%	
I _{Lmax} :	100 mA	
Switching threshold of positive edge:	15 V	
Switching threshold of negative edge:	5 V	
T _{on} of the product sensor signal	0.3 ms	

Coding Service Manual

DC-decoupled mode:

- In this mode of operation, there is no DC-coupling between the machine and the connected peripheral equipment.
- The VCC and GND must be connected to the external supply voltage.
- The correct mode of operation must be set at the printer.

Supplementary technical data		
VCC (+UB external – GND external) max.:	29 V	
VCC (+UB external – GND external) min.:	20 V	
I _{min} of product sensor signal:	4 mA	
I _{max} of product sensor signal:	20 mA	



ATTENTION

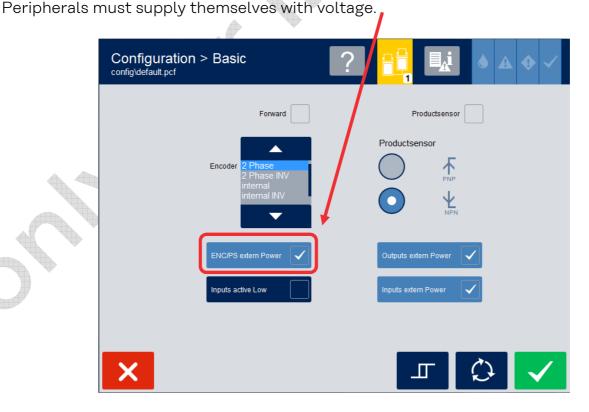
For the DC-coupled or DC-decoupled modes, the correct setting must be chosen in the software, as otherwise the machine may be damaged.

See the **Configuration > Basic** menu

Push button: ENC/PS external voltage (7-pole socket)

□: Clock generator and product sensor supplied internally with voltage. Peripherals that provide signals are supplied with voltage by the alphaJET.

☑: Clock generator and product sensor supplied externally with voltage.



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Encoder

In order to achieve a uniform print image, the speed with which the product passes the print head must be transmitted to the machine. To do this, an encoder must be connected, for instance, to a conveyor belt.

Both single-channel and dual-channel encoders may be connected. As a rule, the machine only requires a single-channel encoder for speed detection. However, if a dual-channel encoder is used, the printing direction can also be detected automatically.

Note



If a single-channel encoder is used, channel A of the connection pin must be used. In this case, channel B is not connected.

Channel B can then be used as the external direction input. Even if no encoder is connected, channel B can be used for direction recognition.

DC-coupled mode:

- The signal output of the connected sensor must be able to drive a load current of min. 20 mA. The signal input at the printer requires a minimum current of 20 mA, or a floating state.
- The correct mode of operation must be set at the printer.

Technical data	
VCC (+UB internal – GND internal)	24 V ± 5%
I _{Lmax} :	100 mA
I _{min} channel A, B:	6 mA
Switching threshold of channels A, B:	16.5 V
F _{max} channel A, B:	100 kHz

DC-decoupled mode:

- In this mode of operation, there is no DC-coupling between the machine and the connected peripheral equipment.
- The VCC and GND must be connected to the external supply voltage.
- The correct mode of operation must be set at the printer.

Supplementary technical data		
VCC (+UB external – GND external) max.:	29 V	
VCC (+UB external – GND external) min.:	20 V	
I _{min} channel A, B:	5 mA	
I _{max} channel A, B:	10 mA	

Coding Service Manual



ATTENTION

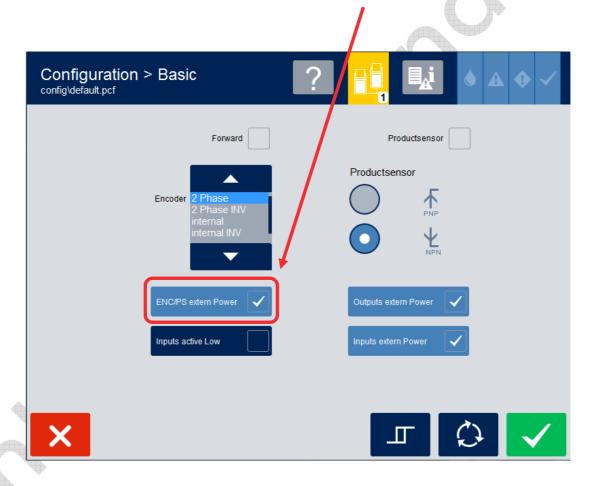
For the DC-coupled or DC-decoupled modes, the correct setting must be chosen in the software, as otherwise the machine may be damaged.

see Configuration > Basic menu

Push button: ENC/PS external voltage (7-pole socket)

□: Clock generator and product sensor supplied internally with voltage. Peripherals that provide signals are supplied with voltage by the alphaJET.

☑: Clock generator and product sensor supplied externally with voltage. Peripherals must supply themselves with voltage.



Coding Service Manual

2.4 Optional signal inputs /signal outputs

- The optional inputs and outputs can be used for extended communication with the machine on the machine level. The assignment of the signals depends on the printing program selected.
- Here it is again possible to choose the DC-coupled connection to the "outside world" or to choose to have inputs and outputs electrically decoupled from the machine. In the latter case it must be ensured that the inputs can be configured independently of the outputs.
- The pin assignment may vary depending on the PrintControl program.

ATTENTION



To ensure trouble-free operation of the machine, it is vital to use shielded cables to prevent interference signals from developing.

If it is not possible to use shielded cables, the ground connector used must be connected to the connector housing.

- The signal for the inputs may be supplied by outputs with NPN switching characteristics (active at 0 V) or with PNP switching characteristics (active at 24 V).
- The machine's outputs are provided with PNP characteristics.

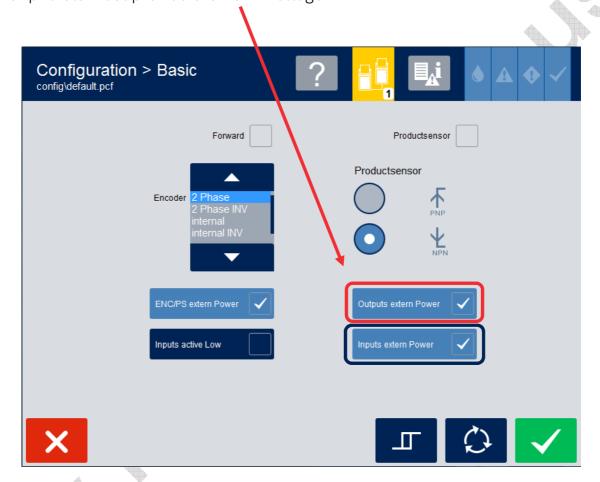
Coding Service Manual

see Configuration > Basic menu

Button: Outputs extern Power (16-pin socket)

□: Outputs are supplied internally with voltage. Peripherals that provide signals are supplied with voltage by the alphaJET.

☑: Outputs are supplied externally with voltage. Peripherals must provide their own voltage.



Button: Inputs extern Power (16-pin socket)

☐: Inputs are supplied internally with voltage. Peripherals that provide signals are supplied with voltage by the alphaJET.

☑: Inputs are supplied externally with voltage. Peripherals must provide their own voltage.

Pin assignment of the IO socket				
Device socket	Pin	Designation	Function	
	1	OUTPUT_GND		
1 • • • • • • • • • • • • • • • • • • •	2	INPUT_7	Element selection (bit 2)	
13 16 10	3	INPUT_GND		
(3° • so • 9)	4	OUTPUT_0	Printing	
14 15 15	5	INPUT_0	Reset TPM (travel path measurement)	
5 • 7	6	OUTPUT_1	Filling the tank	
6	7	INPUT_1	Resetting the print mark divider	
	8	OUTPUT_2	Ready	
	9	INPUT_VCC		
	10	OUTPUT_3	Alarm	
	11	OUTPUT_VCC		
	12	INPUT_2	Resetting OPS (over print suppressor	
	13	INPUT_3	Resetting internal counter	
	14	INPUT_4	Resetting the text list	
	15	INPUT_5	Element selection (bit 0)	
	16	INPUT_6	Element selection (bit 1)	
	Housing	Line shield		

Coding Service Manual

DC-coupled mode:

- The VCC outputs are supplied by the printer.
- The correct mode of operation must be set at the printer.

Technical data	
VCC (+UB internal – GND internal)	24 V ± 5%
U _a of an output	24 V - 10%
$I_{l extsf{max}}$ of an output:	100 mA
I _{l max} of all outputs:	400 mA
I _{min} of an input:	4 mA
I_{max} of an input:	10 mA
Switching threshold of an input, positive flank:	15 V
Switching threshold of an input, negative flank:	5 V

DC-decoupled mode:

- In this mode of operation, there is no DC-coupling between the machine and the connected peripheral equipment.
- The VCC and GND must be connected to the external supply voltage.
- The correct mode of operation must be set at the printer.

Supplementary technical data		
VCC (+UB external - GND external) max.:	29 V	
VCC (+UB external - GND external) min.:	20 V	
I _{min} of an input:	4 mA	
I_{max} of an input:	20 mA	



ATTENTION - Risk of damage to the device or components!

The total power of all the components supplied by the printer must not exceed 10W!

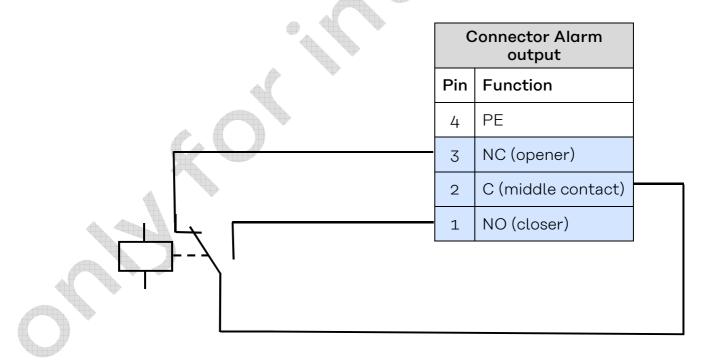
Coding Service Manual

2.5 Alarm output

The device provides the changeover contact of a relay via the alarm output. The relay can be used as opener or closer (see pin assignment).

Device socket	Pin	Designation
	1	NO (normally open = closer)
	2	C (middle contact)
5 6 O	3	NC (normally closed = opener)
	4	PE
3	5	Unused
	6	Unused

Technical data	
Load current:	1 A
Switching voltage:	230 V



Coding Service Manual

2.6 Serial interface

The serial interface is used for the data connection between the device and a PC or other controllers. The connecting cable (serial cable) used for this purpose must be a null modem cable.

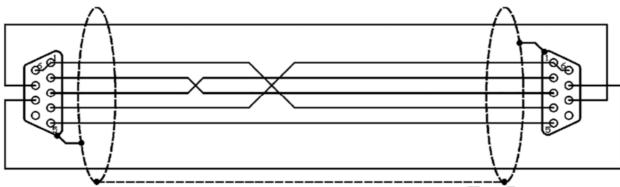


Figure 9: Construction of a null modem cable to connect the device to the PC:

Pin 1 DCD Pin 2 RxD
Pin 3 TxD Pin 4 DTR (output)
Pin 5 GND Pin 6 DSR (input)
Pin 7 RTS (output) Pin 8 CTS (input)

 The device has two RS 232 interfaces. The parameters are configured using the device's user

interface.

- The RS 232 interfaces support the G-PRINT protocol.
- The interfaces only support peer-to-peer (P2P) connections.
- It is not possible to daisy chain from device to device.

2.7 Ethernet interface

- Standard interface (TCP/IP)
- Connection to networks
- Fast data transfer
- FTP server for fast access
- Easy remote maintenance

Coding Service Manual

3. Switching the device on/off

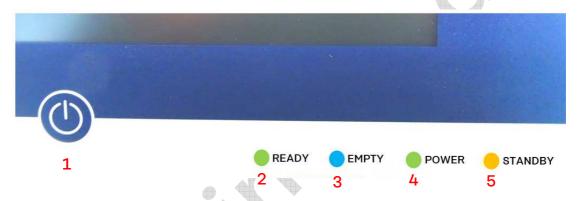
Requirements:

- The device is in good technical condition.
- All necessary safety measures have been taken.
- The power supply meets the device specifications.

Run/Stop key:

Briefly press the run/stop key (1) to switch on \rightarrow ... normal start to operational readiness Press the run/stop key (1) to switch on until the power LED lights up \rightarrow ... service start Briefly press the run/stop key (1) to switch on \rightarrow ... machine switches off and remains in stand-by mode

Status LEDs:



Pos.	LED	Display	Meaning
1	Power button (no LED)	-	Switching on / off the device
2	READY (green)	Shines with a steady light	The machine is ready for operation. For the next print initiation by the product sensor, the selected text is printed.
3	EMPTY (blue)	Shines with a steady light	The ink or solvent bottle is empty. → Change the ink or solvent bottle.
4	POWER (green)	Flashes slowly	Starting procedure: The machine changes to operating mode.
		Flashes quickly	Shutdown phase: The machine changes to STAND BY mode.
	>	Shines with a steady light	The machine is in operation.
5	STANDBY (orange)	Flashes	The supply voltage is activated. The device is in STAND BY mode.
4/5	Ink Care (orange/green)	Flashes slowly	Ink Care mode (pigmented systems only): The device is in STAND BY mode. Every 4 hours, the stirrer and the pressure pump run for 10 minutes.

Coding Service Manual

Signal tower (optional)

1 ERROR signal lamp (red)

2 SERVICE signal lamp (yellow)

3 READY signal lamp (green)

4 Consumables signal lamp (blue)

5 Signal tower



1

Coding Service Manual

STAND BY mode:

- Switch on unit at the main switch.
- ✓ The flashing STAND BY LED indicates that the device is in STAND BY mode.

SERVICE mode:

(for maintenance, service or software update).

- To start the machine in SERVICE mode, press and hold the Power button until the POWER LED lights up (approx. 5 to 10 s).
- ✓ This switches the device on, without the pumps, ink beam or high voltage supply being activated automatically.

OPERATING mode:

- ✓ The head lid should be opened and the head mounted at a suitable location.
- ✓ Briefly press the Power button.
- ✓ The unit starts in operating mode.
- ✓ After an automatic self-diagnosis, the ink system is activated and ink beam is switched on.
- ✓ After a successful self-diagnosis and closing of the print head, the green READY LED goes on and the unit is ready to print.

Power down:

Never turn the device off during normal operation using the main switch, instead always use the **Power button**.

- Press Power button.
- ✓ If the device is in service mode, the device changes directly into the STAND BY mode.
- ✓ If the device is in OPERATING mode (ink on), then first just the ink system is shut down (takes approximately 3 minutes), then the device goes into STAND BY mode.

Coding Service Manual

4. Tools and instruments

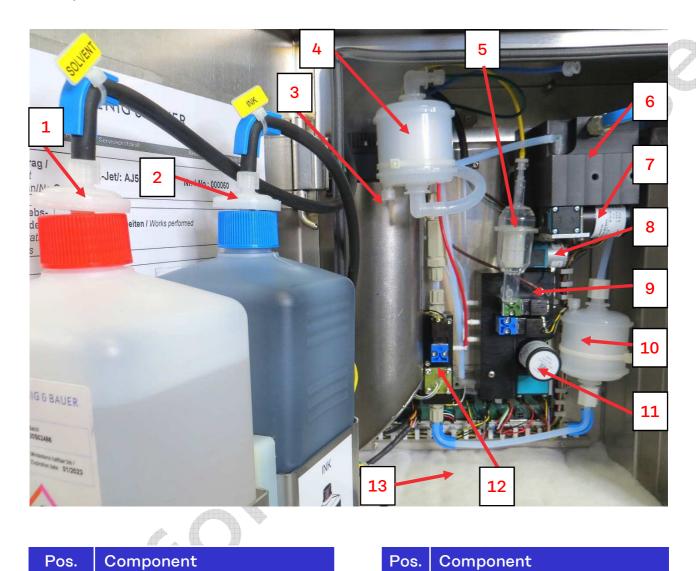


E II	/// / / / / / / / / / / / / / / / / /
	Tools
1	Safety glasses
2	Flashlight
3	Gloves
4	Magnifying glass
5	Shortened Allen key
6	Tweezer
7	Allen key (1.5; 2; 2.5; 3)
8	Torx keys
9	Philips screwdriver
10	Torque wrench
11	Side cutter
12	Long-nose pliers angled
13	Long-nose pliers straight
14	Fork wrench (SZ 14)

Coding Service Manual

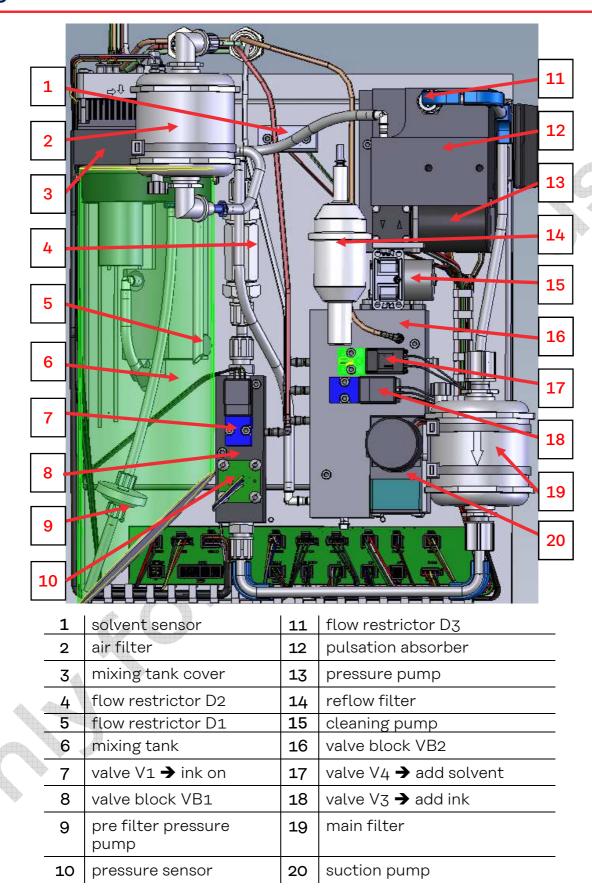
5. Ink system

5.1 Components



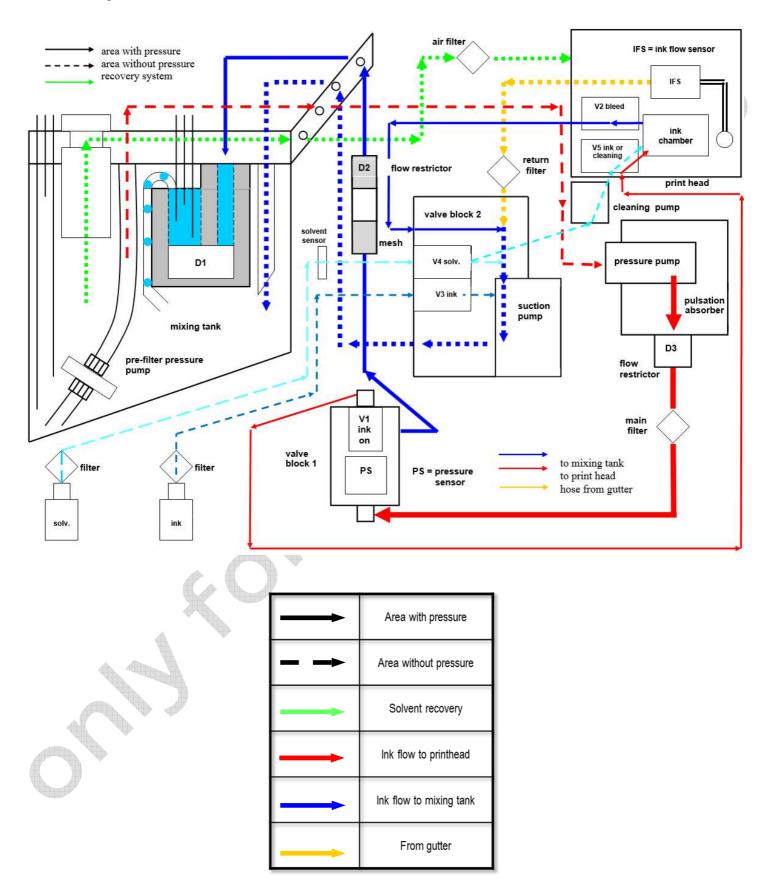
Pos.	Component
1	Solvent filter
2	Ink filter
3	Mixing tank
4	Air filter
5	Return filter
6	Damper
7	Pressure pump

Pos.	Component
8	Cleaning pump
9	Valve block 2
10	Main filter
11	Suction pump
12	Valve block 1
13	Floor filter



Coding Service Manual

5.2 Ink system schematic



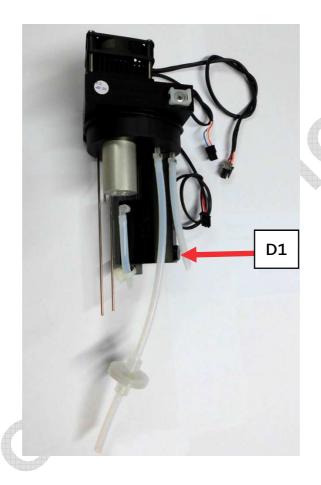
Coding Service Manual

5.3 Throttles

5.3.1 Visco-throttle D1

In 1040.6067 holder for viscometer.

Installed in the bottom side of the viscometer inside the mixing tank





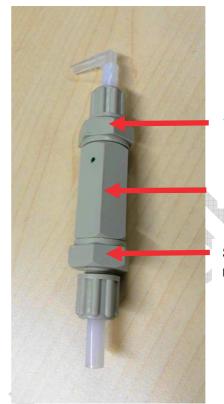
Coding Service Manual

5.3.2 Flow restrictor D2

Flow restrictor D2 1040.6924

Installed inside the connection hose from the topside of valve block 1 to the mixing tank

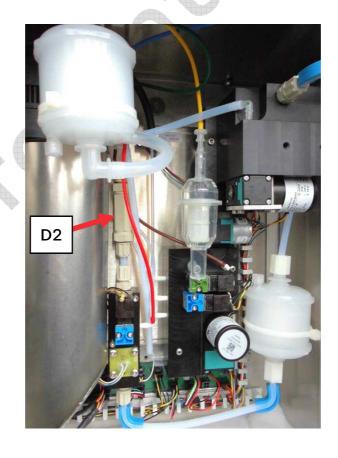
For exchange drain the ink circuit! (→ see chapter 7.1 **Emptying the ink** circuit page 52).



Throttle screwing

Bushing

Screwing with mesh



Coding Service Manual

5.3.3 Damper throttle D3

Damper throttle D3

1037.9670

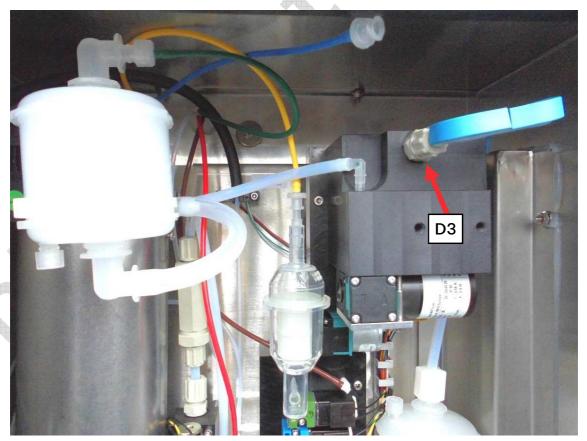
Installed inside the grey screwing at the front side of the pulsation absorber (outlet)

For exchange drain the ink circuit!

(→ see chapter 7.1 Emptying the ink circuit page 52).

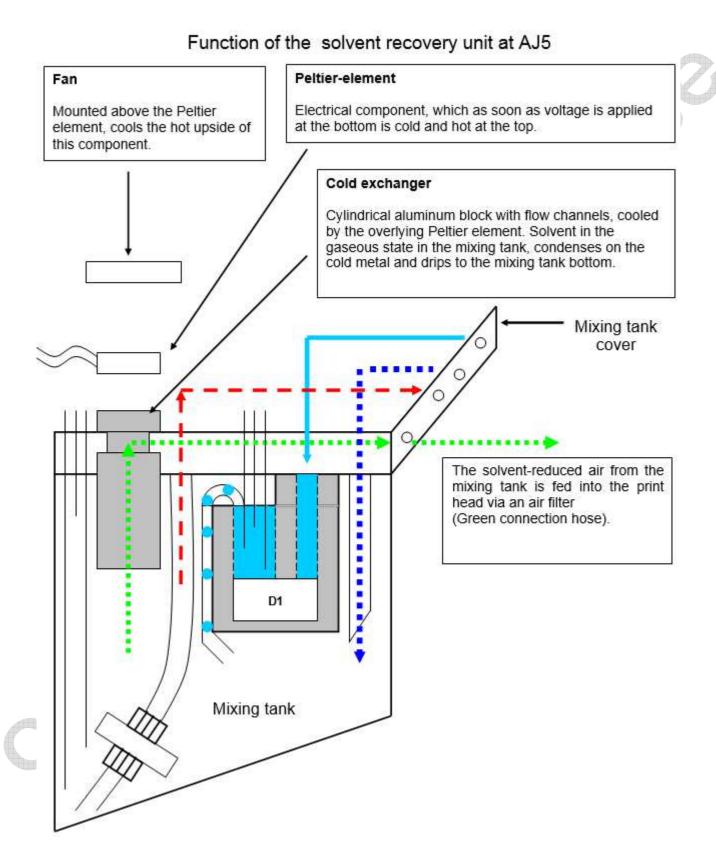






Coding Service Manual

5.4 Mixing tank and recovery circuit

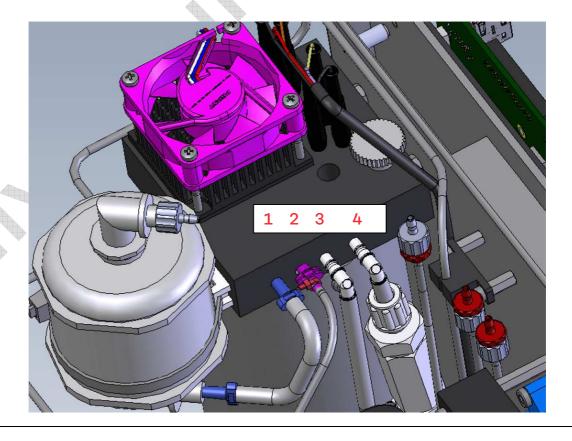


Coding Service Manual

5.4.1 Mixing tank cover connectors



Pos.	From	То	Note
1	Mixing tank	Air filter	Recovery circuit
2	Pre filter pressure pump inside mixing tank	Inlet pressure pump	Ink supply for pressure pump
3	Suction pump	Mixing tank	Ink return to the mixing tank
4	Valve block 1	Mixing tank visco meter	Ink for viscosity measuring via flow restrictor D2



Coding Service Manual

5.4.2 Recovery unit



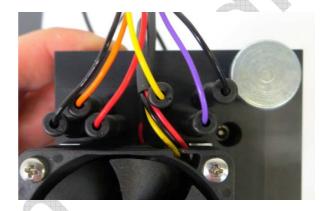
Coding Service Manual

5.4.3 Connection cables mixing tank

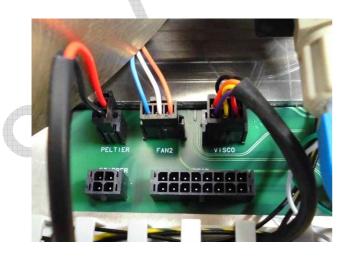
plug J5 Peltier pin	cable color	signal	meaning
1	red	Peltier out +	VCC peltier element
2	black	Peltier out -	GND peltier

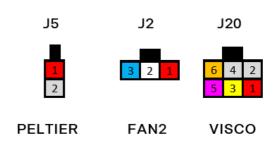
plug J2 FAN2 pin	cable color	signal	meaning
1	red	VCC	VCC peltier element
2	white	rotation	rotation signal
3	black or blue	GND	





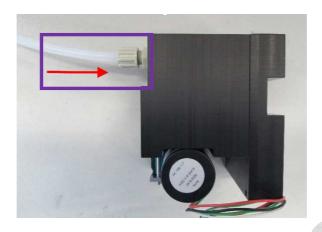
plug J20 Visco pin	cable color	signal	meaning
1	red	Tank Bottom	sufficient ink available
2	black	GND	GND tank
3	yellow	Visco Bottom	lower visco electrode
4	black	GND	GND visco
5	purple	Visco Top	upper visco electrode
6	orange	Tank Top	mixing tank overfilled

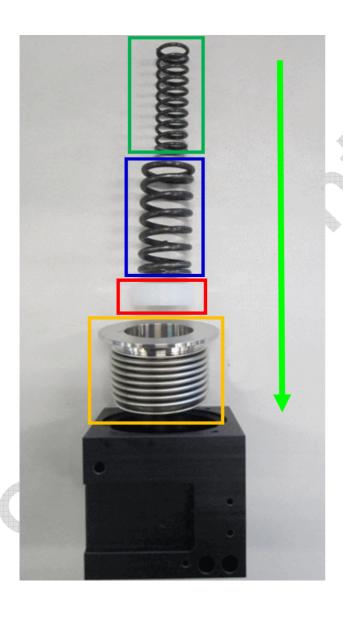




Coding Service Manual

5.5 Pulsation absorber (damper) for AJ5 SP and AJ5 HS





Assembling:

- Insert the metal bellows into the damper housing
- Insert guidance damper spring with closed side downwards into metal bellows
- Insert big compression spring into the guide Damper spring
- Insert small compression spring into the guide Damper spring
- Replace throttle D3
- Replace damper sealing (o-ring)

Coding Service Manual

5.6 Valves

Nr.	order nr.	designation	housing color	cable colors
V1	1040.6811	MAGNETIC VALVE INK SYSTEM 2/2-12V	blue	black – black – <mark>yellow</mark> / <mark>green</mark>
V2	1040.6813	MAGNETIC VALVE HEAD 2/2 - 12V	blue	black – black – <mark>yellow</mark> / <mark>green</mark>
V3	1040.6811	MAGNETIC VALVE INK SYSTEM 2/2-12V	blue	black – black – <mark>yellow</mark> /green
V4	1040.6920	MAGNETIC VALVE INK SYSTEM 3/2-12V	green	black - black
V5	1040.6438	MAGNETIC VALVE HEAD 3/2 - 12V	green	black - black

V1 = valve 1 ink beam on / off

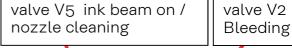
V2 = valve 2 bleeding the ink chamber

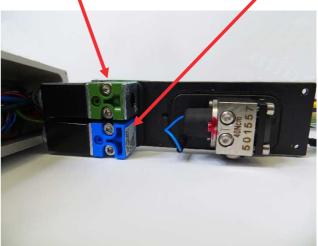
V3 = valve 3 add ink V4 = valve 4 add solvent V5 = valve 5 ink beam on / nozzle cleaning

valve V1 ink beam on valve V3 add ink

valve V4 add solvent







Coding Service Manual

Valves switching statuses

State	Voltages at the valve connectors			
at rest =	V1	on both sides	12 Volt	
untriggered	V2-V5	on both sides	0 Volt	
in active state	V1	1 side 12 Volt	1 side alternating 0/12 Volt	
triggered	V2-V5	1 side 0 Volt	1 side permanently 12 Volt	

Coding Service Manual

6 Filling and emptying of ink system

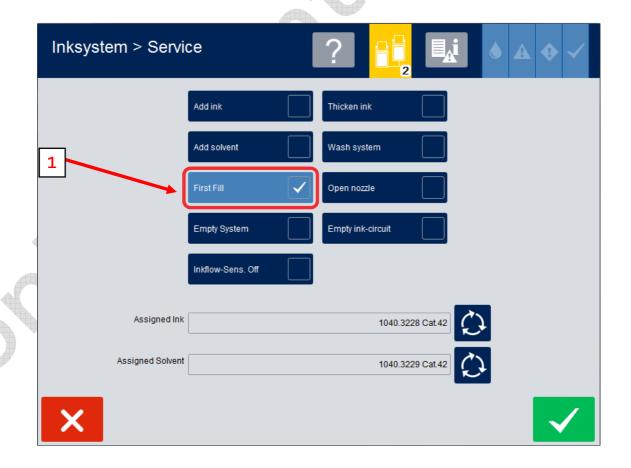
6.1 Initial filling (FirstFill)

Requirement:

- The device is in good technical condition.
- The ink system is in good technical condition.
- The ink system is not filled.

In order to prevent the environment and the machine from being contaminated with ink and solvent during the transport, Koenig & Bauer Coding will empty the ink and solvent supply bottles and the mix tank prior to being delivered. The following procedures must be undertaken before re-commissioning:

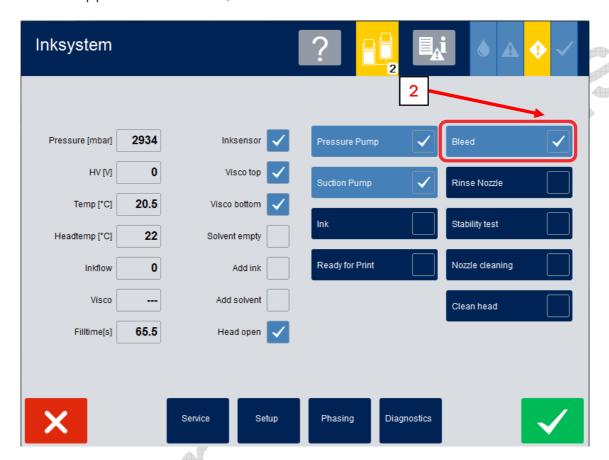
- Place the ink bottle (1 liter) in the bottle holder and connect. Mind pictogram!
- Place the solvent bottle (1 liter) in the bottle holder and connect. Mind pictogram!
- Close the gutter with the gutter locking closure.
- Start the machine in **SERVICE** mode.
- In the Ink system / service menu, press the First Fill (1) button.
- The filling operation starts automatically and stops after approx. 30 minutes.
- If the device is put into operation after the first fill, the gutter closure must be removed.



Coding Service Manual

Bleeding the print head:

- After filling the system, the print head and its lines must be bled.
- The machine is in **SERVICE** mode, remove the gutter closure if mounted.
- Switch on the button for **Bleed** function (2) in the ink system menu. After approx. 10 minutes, switch off the **Bleed** function.





NOTE

For information on initial filling or refilling after transport, also refer to supplementary sheet.

NOTE



After refilling has been completed, the error message "Ink bottle empty" may appear for a certain time even though the bottle is now full enough.

Acknowledge error message.

Coding Service Manual

6.2 Emptying the ink system

0.2 [nptying the lik system	11
	Components	
1	Gutter/Gutter locking closure	A STATE OF THE STA
2	Connecting hose suction pump-mixing tank	
3	Drain hose 1038.0280	
4	Connection connecting hose suction pump-mixing tank	100
3 IG & B Jett: AJS Arte Arbeiter	Nr. No. 00060	Pos. 3

Requirement: Device is switched off.

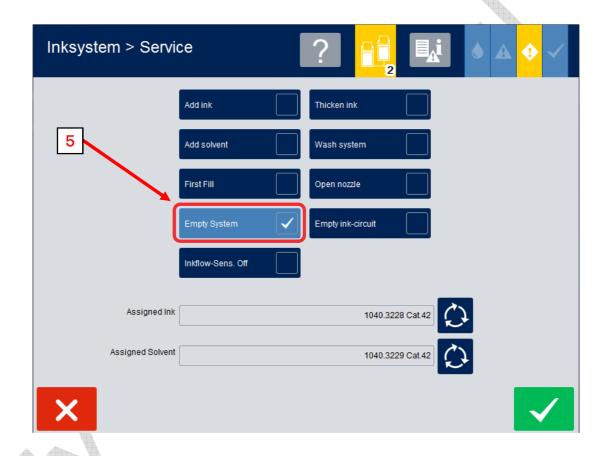
- 7 Switch off the marking system
 - Close the gutter with the gutter closure (1).
 - After waiting for approximately 5 minutes. Remove the connection hose suction pump to mixing tank from the mixing tank cover connector at position 3 (2).
 - Connect one end of the drain hose (3) to the connection hose (4).
 - Insert the open end of the drain hose into an empty, solvent-resistant bottle (with a capacity of at least 1 liter).
 - Note: The cap of the ink bottle must not be screwed down.

Coding Service Manual

- 7 Start the machine in **SERVICE** mode.
 - In the Ink system /service menu, press the Empty system (5) button. The Empty system procedure is monitored by the device and automatically stopped as soon as the system is empty.
 - After the operation has finished, remove the drain hose from the connection hose
 - Connect the connection hose back to the mixing tank connector.
 - Remove the gutter locking closure.

In menu ink system → service → Empty System

(duration about 25 min.). Operation ends automatically.



Coding Service Manual

7. Filling and emptying the ink circuit

7.1 Emptying the ink circuit

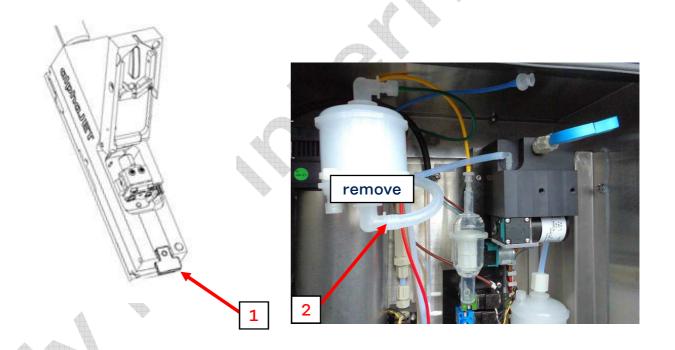
In order to replace the components of the ink system (e.g main filter, return filter, pre filter) in a simple and clean way, the ink circuit can be emptied. The ink from the ink circuit and the print head cycle is emptied into the mixing tank.

Requirement:

• The machine is in the service mode.

Procedure:

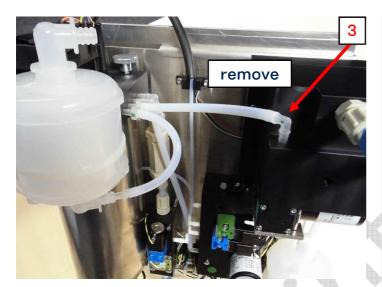
- Switch off the device.
- Close the gutter with the gutter cap (1).
- Start the machine in **SERVICE** mode.
- Loosen the connection hose between the mixing tank and air filter (2) at the air filter inlet.



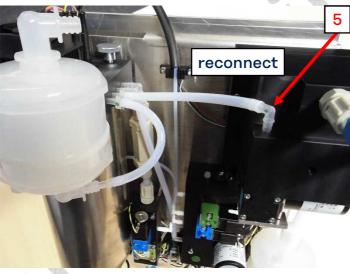


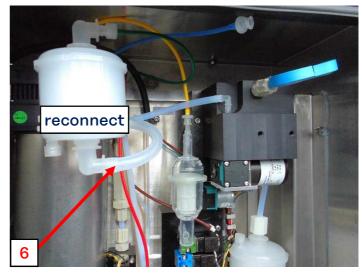
Coding Service Manual

- Loosen the connection hose between the mixing tank and pressure pump (3) at the mixing tank inlet.
- In the Ink system / service menu, press the Empty ink circuit (4) button.
- Stop the function after approx. 15 minutes. Almost all of the ink will be in the mix tank.
- Plug in the connection hose between the mixing tank and pressure pump (5) at the mixing tank inlet.
- Plug in the connection hose between the mixing tank and air filter (6) at the air filter inlet
- Next Step (see chapter 7.2 Filling the ink circuit page 54).









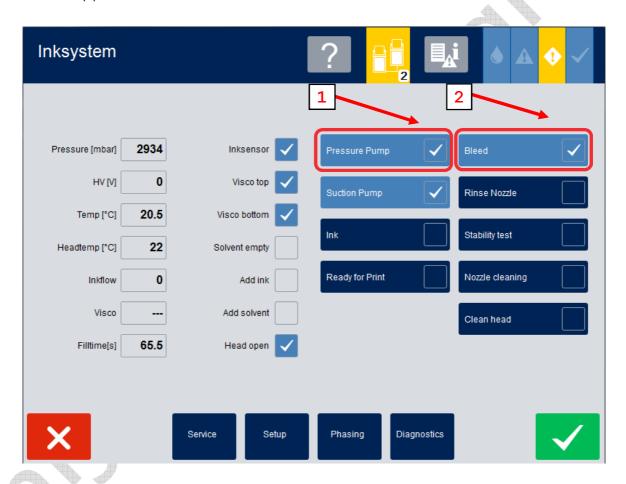
Coding Service Manual

7.2 Filling the ink circuit

Requirement:

• The device is in the service mode.

- In the Ink system menu, press the Pressure pump (1) button and wait for the pressure to stabilize on the adjusted value.
- If the pressure surveillance shows an error, repeat the function.
- Once the required pressure has been reached, press the **Bleed (2)** button in the **Ink** system menu.
- The **Bleed** function is active. The print head and the lines to it are bled.
- ✓ After approx. 10 minutes, switch off the Bleed function



Coding Service Manual

7.3 Washing the ink system

Requirement:

- Ink system is empty.
- Nozzle and gutter are closed.

Procedure:

Insert a half-full solvent bottle into the device instead of an ink bottle, alternatively, both bottle adapters can also be plugged into the solvent bottle.





- In the Ink system / Service menu.
- Press the Wash system button to start the procedure.
- The Wash system procedure is performed automatically by the device.
- The function does not stop automatically. An explicit exit is required.

All components of the ink system including the print head are rinsed with solvent.



Before repeating the Wash system procedure, the ink system must first be emptied to prevent the system from overfilling.

- Then rinse the gutter with solvent (see Rinsing the gutter in operating manual).
- Then empty the ink system (see chapter 6.2 Emptying the ink system page 50).

Coding Service Manual

8. Ink system maintenance



ATTENTION

- Never dip the print head in solvent for cleaning!
- The print head lid should remain open after cleaning until the print head is dry. If the lid is closed, the high voltage switches back on again automatically, which could ignite any gases in the print head!



CAUTION

Risk of injury though unauthorised or improper handling of the print head!







NOTE

Please observe the maintenance and repair instructions for the various individual components in this service manual!

Before authorised personnel start their maintenance and repair work

- switch off the device.
- the power supply must be turned off by means of the main switch.
- Before you begin to work on live assemblies or components: Disconnect the power plug from the mains!
- The compressed air supply must be depressurised.



NOTE

To be able to perform maintenance work on the device you can start the marking system manually in *SERVICE mode,* Section Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden, page 33.

- To start the marking system in *SERVICE mode*, press and hold the POWER button until the *POWER LED* lights up (approx. 5 to 10 seconds).
- This switches the marking system on, without the pumps, ink jet or high voltage supply also being started.

After the system has started, you can call up the commands listed in the *Ink system* > *Service* menu one by one, without the marking system automatically entering print mode.



NOTE

Further information about accessories can be found under https://coding.koenig-bauer.com.

Coding Service Manual

8.1 Maintenance schedule

Interval	Action	Responsibility
Every day	Check level of the ink bottle.Check level of the solvent bottle.Clean the print head.	Operating personnel
Weekly	Check nozzle closure, clean if necessaryClean marking system.	Operating personnel
Every six months	 Switch main and return filter for pigmented systems.* Change ink.* 	Skilled personnel
annually	 Switch main and return filter (recovery) for non-pigmented systems.* Replace plastic bottle. 	Skilled personnel Operating personnel
As required	 Check nozzle closure, clean if necessary Check the filter fleece (on the bottom of the housing) and clean or replace it if necessary. 	Operating personnel

- *) Replace at least as often as described in the maintenance schedule or, depending on which occurs first, after -
 - 4,000 operating hours (when using pigmented inks).
 - 10,000 operating hours (when using non-pigmented inks).

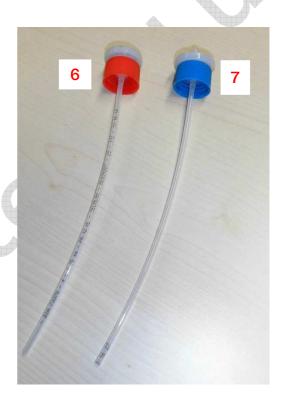
(Dependent on the ink used, the environmental and operating conditions and the particular application).

Coding Service Manual

Requirement:

- The ink system should be serviced by a technician.
- The following components must be replaced:
 - Ink
 - Main filter
 - Return filter
 - Ink and solvent filter
 - Pre filter pressure pump
 - Filter mat





		Filter
	1	Air filter → 1040.2768
	2	Pre filter pressure pump + connection hose → 1040.7377
	3	Reflow filter → 1037.9091
	4	Main filter → 1040.6921
	5	Floor filter → 1040.6914
	6	Bottle connection with filter solvent bottle $ ightarrow$ 1040.3450
	7	Bottle connection with filter ink bottle → 1040.2970

Coding Service Manual

8.2 Replacing the filter mat

Procedure:

• Open the front door of the device and replace the filter mat.

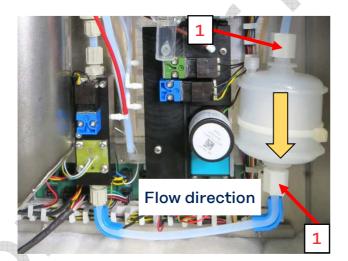
8.3 Changing the main filter

Requirement:

- Ink system is empty (see Emptying the ink system).
 (See chapter 6.2 Emptying the ink system page 50)
- Device is switched on.

Procedure:

- Empty ink system / Empty ink circuit (see page 50, 52). Then switch off the machine.
- Loosen the union nuts (1) of the two screw couplings.
- Disconnect the filter from the connection tubes.
- Releasing the connections it is possible that a small quantity of ink runs out.
- Use absorbent paper to pick up the ink residues.
- Plug the new filter (2) onto the ends of the tubes, paying attention to the flow direction.
- Tighten the union nuts of the screw couplings.
 Then retighten it with a fork wrench 1½ up to 2 rotations.
- The main filter has now been replaced.
- Start the machine in **SERVICE** mode.
- First fill ink system/ refilling ink circuit (see page 48,54).





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Coding Service Manual

8.4 Replacement return filter

Requirement:

• The ink system does not need to be emptied.

Procedure:

- Switch off the device.
- Remove the hose from the filter inlet (1).
- Pull the return filter off the valve block (2).
- Loosen the connections it is possible that a small quantity of ink runs out.
- Use absorbent paper to pick up the ink residues.
- Plug the new filter onto the ends of valve block, paying attention to the flow direction.
- Insert the hose at the filter inlet.
- The return filter has now been replaced.







Coding Service Manual

8.5 Replacement pre filter (pressure pump)

Requirement:

- Device is switched off.
- It is not necessary to drain the ink system.



Watch out! There is still a residual amount of ink in the viscometer.

Procedure:

- Switch off the device.
- Dissemble the mixing tank, (see chapter 9.4 Removing the mixing tank page 68).
- Open the mixing tank, (see chapter 9.5 Opening the mixing tank page 69).
- Place the mixing tank filled with ink so that it cannot leak.
- Remove the old pre filter with connecting hose (1).
- Releasing the connections it is possible that a small quantity of ink runs out.
- Use absorbent paper to pick up the ink residues.
- Mount the new pre filter with connecting hose at the mixing tank cover
- The pre filter has now been replaced.
- Assembly in the reversed order.





Coding Service Manual

8.6 Replacement ink – and solvent filter

Requirement:

Switch off the device.

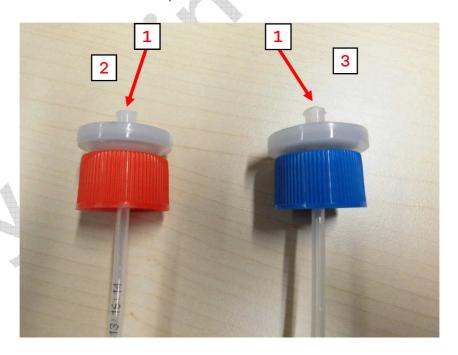
Procedure:

Solvent filter (2):

- Remove the hose from the filter outlet (1).
- Loosening the connections it is possible that a small quantity of ink runs out.
- Use absorbent paper to pick up the ink residues.
- Replace the complete old bottle connection with filter, by a new one.
- Fastening hose connection to the bottle cap.
- The solvent filter has now been replaced.

Ink filter (3):

- Remove the hose from the filter outlet (1).
- Loosening the connections it is possible that a small quantity of ink runs out.
- Use absorbent paper to pick up the ink residues.
- Replace the complete old bottle connection with filter, by a new one.
- Fastening hose connection to the bottle cap.
- The ink filter has now been replaced.





Coding Service Manual

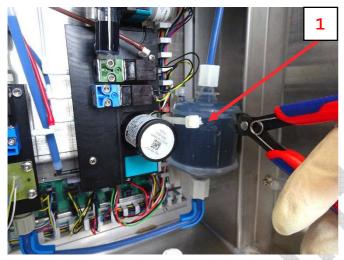
9. Ink system repairs

9.1 Changing pulsation absorber

Requirement: Switch off the device after emptying the ink circuit.

- Drain the ink circuit (see chapter 7.1 Emptying the ink circuit page 52).

 (It is sufficient to remove ink until you can see the ink level sink in the main filter).
- Remove the cable tie from the main filter (1).
- Remove the input tube of the pump (at inlet of pulsation absorber) (2).
- Disconnect the hose to the main filter at throttle D3 at front side of damper (3).
- Place the main filter with connection hose in the left side of the ink system housing (4).



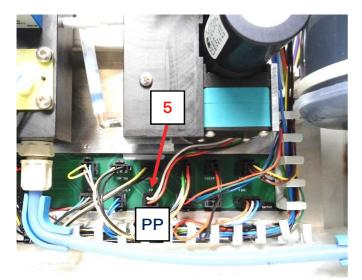


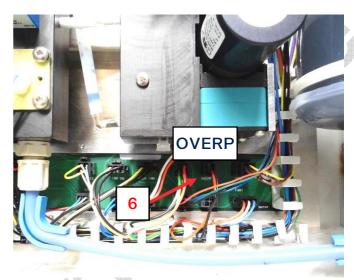


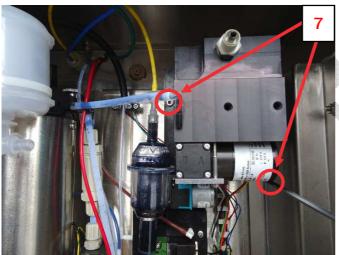


Coding Service Manual

- Unplug the connectors of the pump PP (5) and the overpressure sensor OVERP (6).
- Remove the two screws of the absorber housing (7) and pull the absorber with the pump to the front (8).











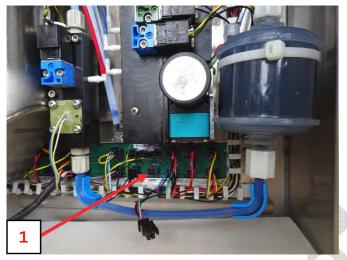
Coding Service Manual

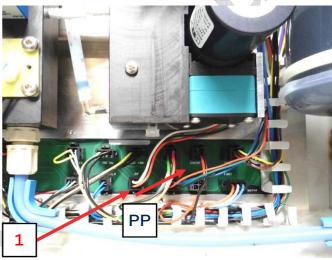
9.2 Changing pressure pump:

Requirement: Switch off the device after emptying the ink circuit.

Procedure:

- Drain the ink circuit (see chapter 7.1 Emptying the ink circuit page 52).
 (It is sufficient to remove ink until you can see the ink level sink in the main filter)
- Unplug the connectors of the pump PP (1).
- Remove the screws at the bottom side of the pressure plate (2).
- Remove the pressure pump, assemble in the reverse order, observe the sealings (3).











Coding Service Manual

9.3 Changing suction pump:

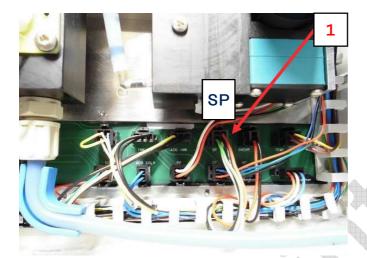
Requirement:

• Switch off the system, it is not necessary to drain the ink system.

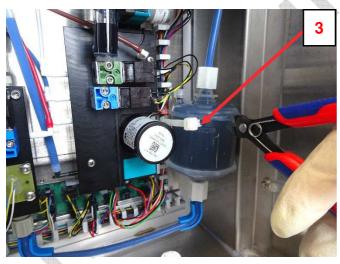
Procedure:

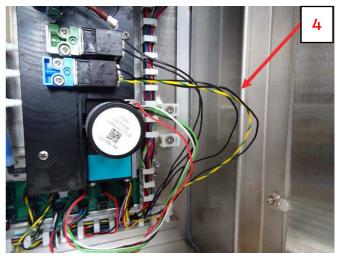
- Remove the electrical connectors **SP** from the suction pump (1).
- Remove the solvent hose out of the solvent sensor (2).
- Remove the cable tie from the main filter (3).
- Remove the connection cables from the valve block in sufficient length from the cable duct (4).

•



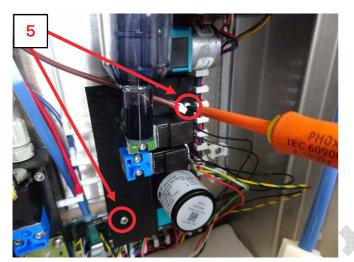


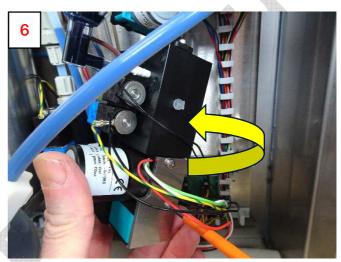


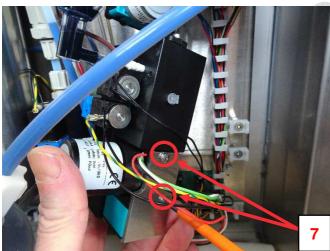


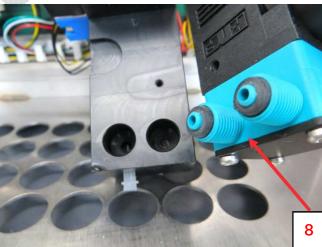
Coding Service Manual

- Loosen the two screws from the big valve block 2 (5).
- Swivel the valve block to reach the fastening screws of the suction pump (6).
 In addition, the angled connectors and ink hoses on the left side of the valve block should be carefully rotated with the valve block.
- Loosen the two screws from the suction pump at the pressure plate (7).
- Remove the suction pump, assemble in the reverse order (8).











Coding Service Manual

9.4 Removing the mixing tank

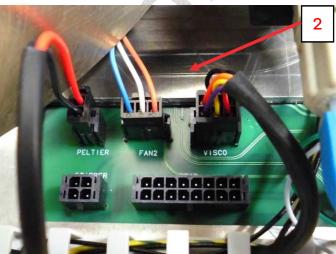
Requirement:

• Switch off the system, it is not necessary to drain the ink system.

Procedure:

- Loosen the four Luer connectors (1) from the mixing tank.
- Disconnect the plugs for PELTIER, FAN2 and VISCO at the ink system connection board (2).
- Loosen the knurled screw of the mixing tank (3).
- Take out the mixing tank (4).
- Assembly in the reversed order.









Coding Service Manual

9.5 Opening the mixing tank

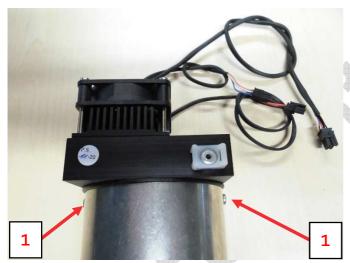
Requirement:

- Switch off the system.
- It is not necessary to drain the ink system.



Watch out! There is still a residual amount of ink in the viscometer.

- Unscrew the two holding screws (1) of the stainless steel tube from the unmounted mixing tank.
- By carefully turning and pulling, the mixing tank lid can be removed and then placed in a solvent-resistant container (2).
- Check the seal and replace it if necessary (3).
- Moisten the O-ring with solvent (do not use grease or oil).
- Assembly in the reversed order.









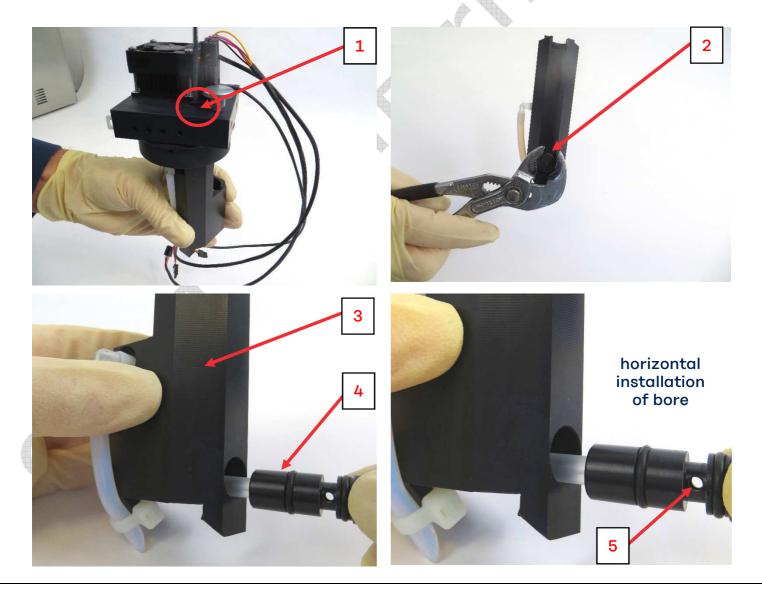
Coding Service Manual

9.6 Replacement or cleaning of the visco throttle D1

Requirement:

- Switch off the system.
- It is not necessary to drain the ink system.
 - Watch out! There is still a residual amount of ink in the viscometer.

- Dissemble the mixing tank, (see chapter 9.4 Removing the mixing tank page 68).
- Open the mixing tank, (see chapter 9.5 Opening the mixing tank page 69).
- Remove the viscometer (loosen screw at top side of mixing tank cover) (1).
- Pull out the throttle holder with the throttle from the viscometer.
- Carefully turn and pull with pliers (2) to remove the visco throttle holder (4).
- Clean the throttle and the viscometer (3) or replace the complete throttle (4).
- Check the seals and replace it if necessary (4).
- Moisten the O -ring with solvent (do not use grease or oil).
- Please note that the bore of the throttle is installed horizontal (5).
- Assembly in the reversed order.



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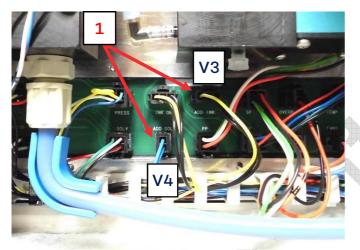
9.7 Change of the valve V3 and V4

Requirement:

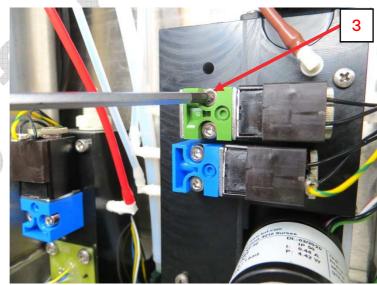
- Switch off the system.
- It is not necessary to drain the ink system.

V3 = ADD INK V4 = ADD SOLV

- Disconnect the electrical connection of the valve (1).
- Remove the ink (V3) and solvent (V4) supply tubes from the bottles and seal them (2).
- Loosen the two fastening screws of the valve and take it out (3).
- Mount a new valve with new sealing from spare part kit. Tighten the screws finger tight.
- Assembly in the reversed order.







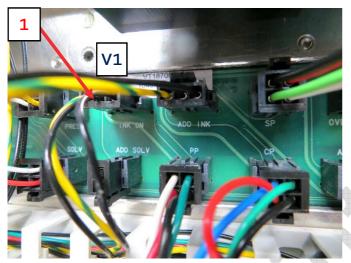
Coding Service Manual

9.8 Replacing the valve V1 ink on

Requirement:

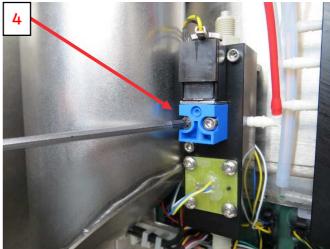
Drain the ink circuit.

- Drain the ink circuit (see chapter 7.1 Emptying the ink circuit page 52).
- Disconnect V1 electrically from connection board ink system (1).
- Place the print head below the controller (2).
- Loosen the two screws of the valve and take it off (3).
- Mount a new valve (4).
- Assembly in the reversed order.









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9.9 Change of the valve block 1

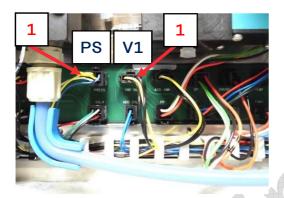
Requirement:

Drain the ink circuit.

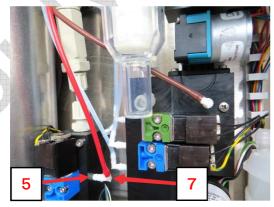
Procedure:

- Drain the ink circuit (see chapter 7.1 Emptying the ink circuit page 52).
- Disconnect valve V1 connection cable and the pressure sensor connection cable (1).
- Remove the upper connector (2) of the connection hose valve block mixing tank (coming from throttle D2) at the mixing tank cover inlet.
- Remove the two screws of the valve block 1 (3).
- Remove the tube coming from the main filter at the bottom side of valve block 1 (4).
- Open the Luer connection (coupling red tube to print head left to air filter) (5).
- Take out the valve block 1, assembly in the reversed order (6).

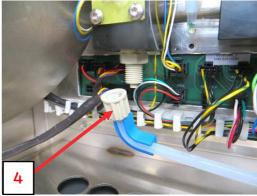
Note: Disconnecting the red tube (7) coming from the print head ink may escape!

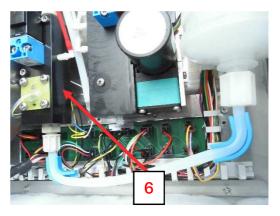












Coding Service Manual

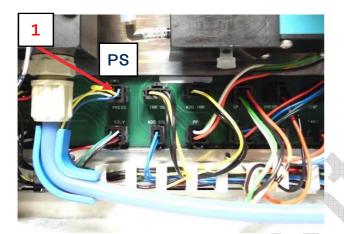
9.10 Change of the pressure sensor

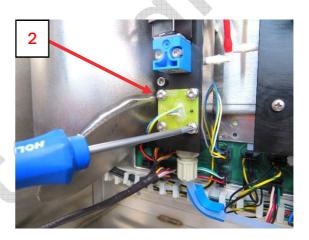
Requirement:

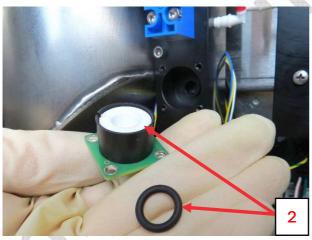
• Drain the ink circuit.

Procedure:

- Drain the ink circuit (see chapter 7.1 Emptying the ink circuit page 52).
- Disconnect the pressure sensor connection cable (1).
- Remove the fastening screws of the pressure sensor and take it out (2).
- When installing the pressure sensor, make sure that the O-ring is seated correctly (3).
- Assembly in the reversed order.







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9.11 Exchange of the flow throttle D2 (connection hose valve block-mixing tank)

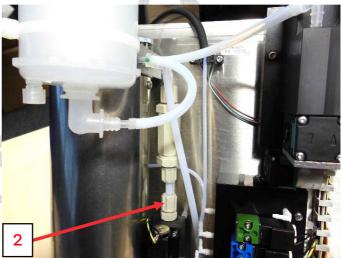
Requirement:

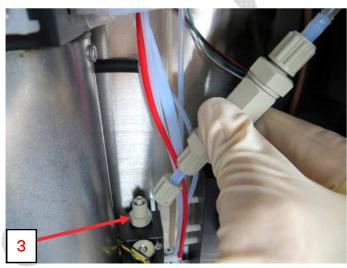
- Switch off the system.
- Drain the ink circuit (not necessary with recommendation for accelerated exchange).

Procedure:

- Dismantle valve block 1 (see chapter 9.10 Change of valve block 1 page 73).
- Remove the upper connector (1) of the connection hose valve block mixing tank (coming from throttle D2) at the mixing tank cover inlet.
- Loosen the union nut at the bottom of the connection hose valve block-mixing tank on top of valve block 1 (2).
- Take out the connection hose valve block-mixing tank (3).
- Mount the union nut on the new hose beforehand (4).





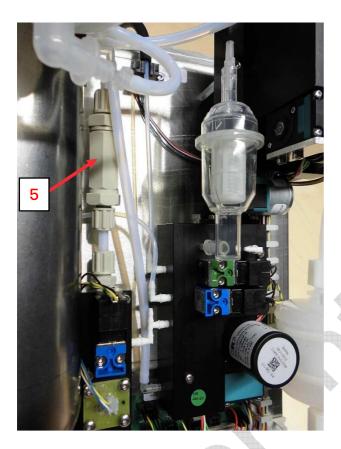




Coding Service Manual

Install a new connection hose valve block-mixing tank (5).

- or clean throttle D2 (6).
- Reassemble in reverse direction and fill ink circuit (see chapter 7.2 Filling the ink circuit page 54).







Connection hose valve block 1 -mixing tank
AJ5 M + AJ5 X : 1040.XXXX
AJ5 HS + AJ5 SP: 1040.6924

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Accelerated exchange of the flow throttle D2: Emptying the ink circuit is not necessary.



Loosen the lower union nut and exchange only the green marked part of the connection hose mixing tank-valve block.

The part of the connection hose marked in red remains in the ink system.

Coding Service Manual

9.12 Replacing the solvent sensor

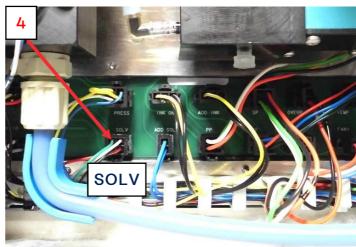
Requirement:

- Switch off the system.
- It is not necessary to drain the ink system.
- Remove the solvent tube from the solvent bottle (1) and drain it with the ADD SOLVENT command (2).
- Remove the mixing tank (3), (see chapter 9.4 Removing the mixing tank page 68).
- Disconnect the electrical connection of the solvent sensor SOLV (4).



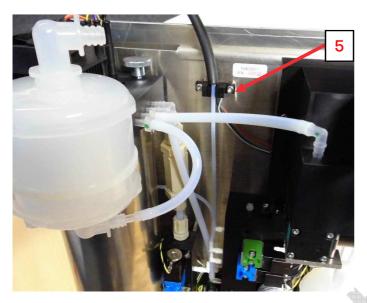




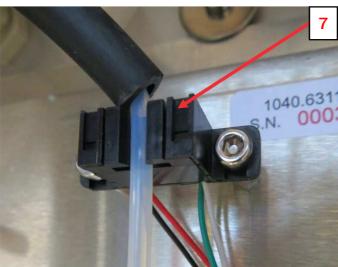


Coding Service Manual

- Loosen the fastening screw of the sensor (5).
- Pull off the hose connection from the valve block (6) and
- Remove connection hose inclusive sensor (7).
- Reassemble in reverse order.



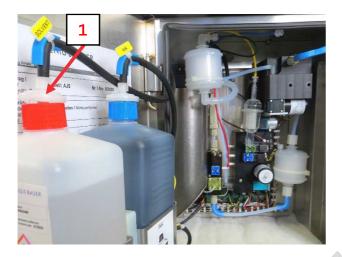


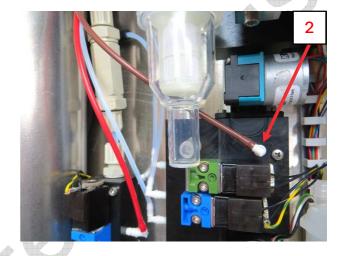


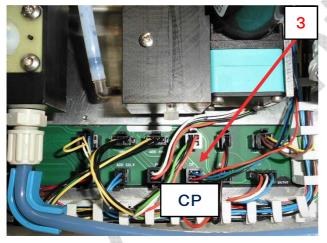
Coding Service Manual

9.13 Replacing the cleaning pump

- Detach the solvent suction hose (V4) from the bottle and close it with the closure piece close (1).
- Pull off the solvent line to the print head and also close it with a sealing piece (2).
- Pull off electrical connection of the cleaning pump (3).
- Remove the cable tie from the main filter (4).



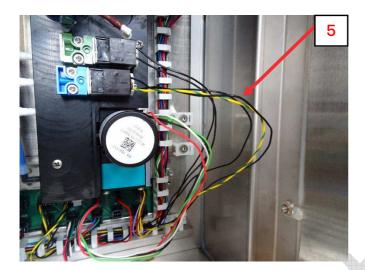


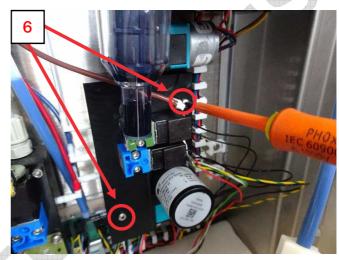


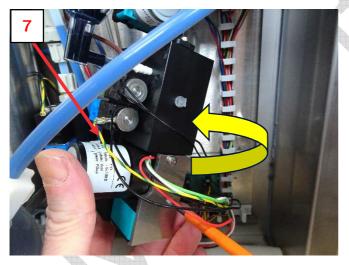


Coding Service Manual

- Remove the connection cables from the valve block in sufficient length from the cable duct (5).
- Loosen the two screws from the big valve block 2 (6).
- Swivel the valve block to reach the fastening screws of the suction pump (7).
 In addition, the angled connectors and ink hoses on the left side of the valve block should be carefully rotated with the valve block.
- Loosen the 2 screws at top side of valve block 2 and remove pump (8).



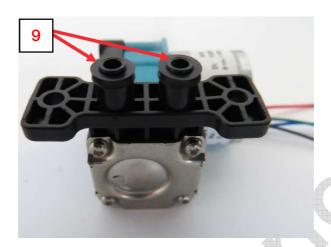


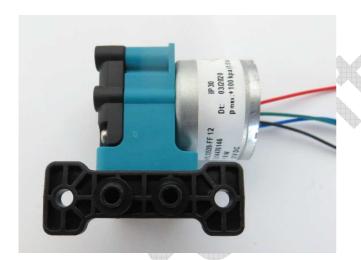




Coding Service Manual

- When installing, pay attention to the correct position of the O-rings (9).
- Reassemble in reverse order.







Coding Service Manual

9.14 Exchange of the RFID module

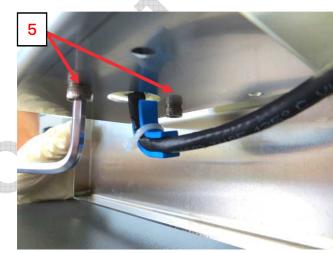
- 1. Shut down the device (1) and switch it off at the main switch (2), then disconnect the power cable (3).
- 2. Disconnect plug connector at circuit board (4).
- 3. Loosen screws and remove RFID module (5).
- 4. Reassemble in reverse order.

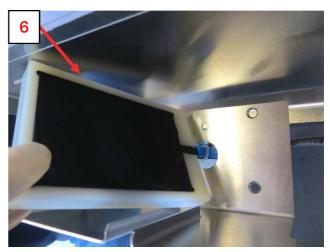








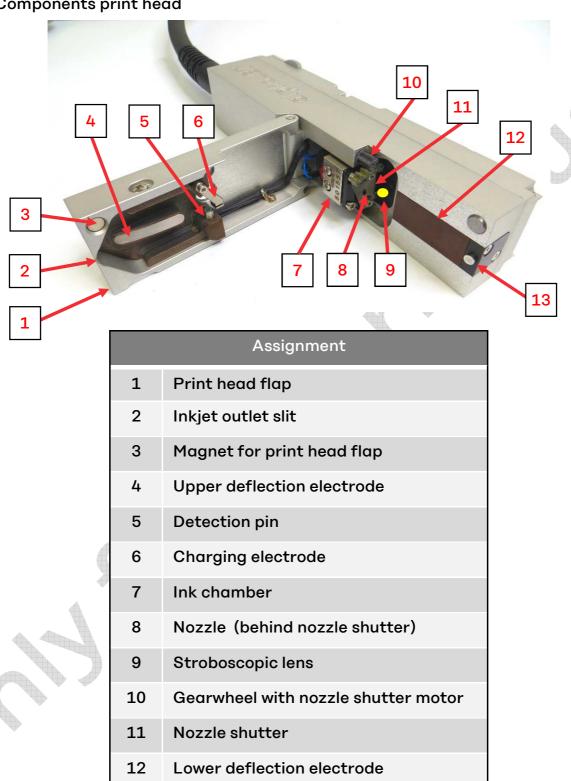




Coding Service Manual

10. Print head

10.1 Components print head



13

Gutter

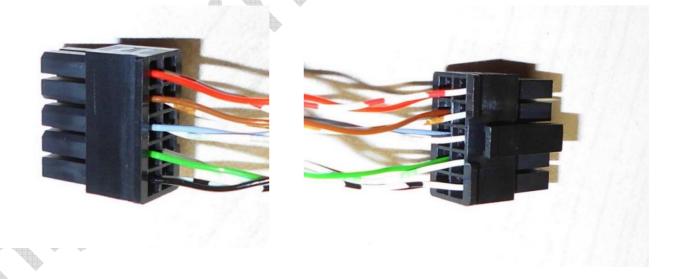
Coding Service Manual

10.2 Assignment of head signal plugs

10.2.1 Connector J11

View on the head signal connector connected to the mainboard at socket J 11.

Signal	Cable color	Pin	Pin	Cable color	Signal
Heater	red	9	10	red white	Heater GND
NC	brown	7	8	brown white	GND
V2 Bleed +	grey	5	6	grey white	V2 Bleed GND
V5 Clean +	green	3	4	green white	V5 Clean GND
Head Power 12 volt	black	1	2	black white	Head Power GND

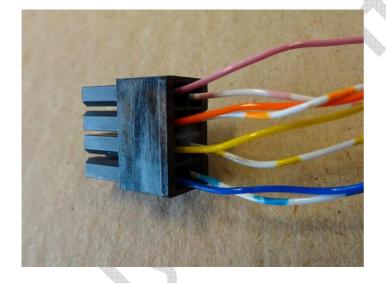


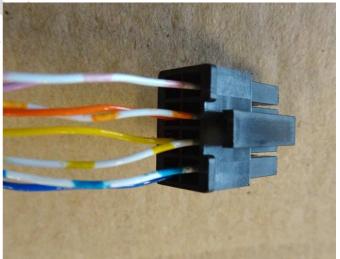
Coding Service Manual

10.2.2 Connector J12

View on the head signal connector connected to the mainboard at socket J 12

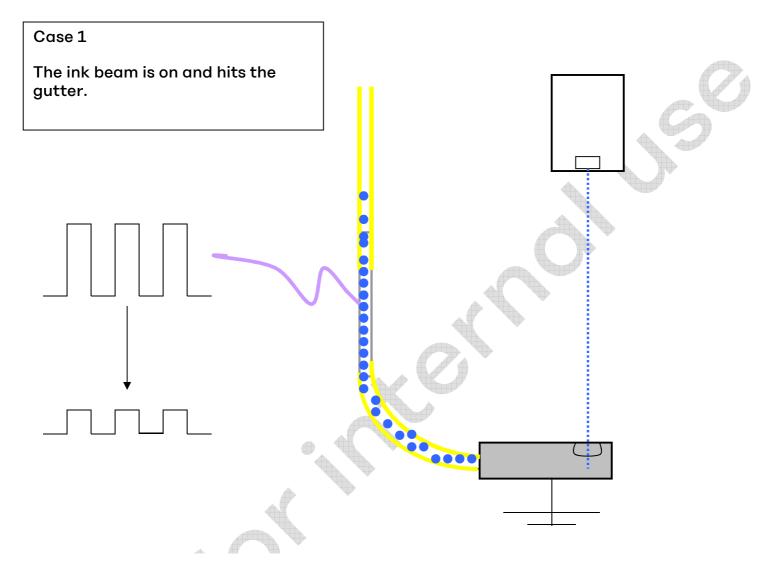
Signal	Cable color	Pin			Pin	Cable color	Signal
Nozzle motor +	pink	7			8	pink white	Nozzle motor -
MOD LED +	orange	5			6	orange white	MOD LED GND
Head open	yellow	3			4	yellow white	Hall sensor GND
Temp VS	blue	1			2	blue white	Temp signal





Coding Service Manual

10.3 Principle of ink flow measurement (reflow sensor)



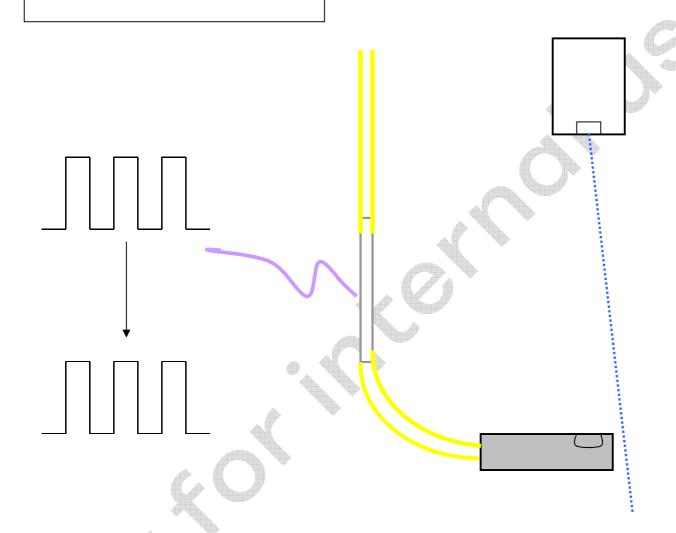
Through the ink there is an electrically conductive connection between the gutter connected to ground and the violet cable at the inkflow sensor with a 24 volt rectangle-signal.

Through that this signal will be damped and the printer knows that the ink beam hits the gutter.

Coding Service Manual

Case 2

The ink beam is on and does not hit the gutter.



Because the ink beam doesn't hit the gutter there is no electrically conductive connection between the gutter connected to ground and the violet cable at the inkflow-sensor with a 24 volt rectangle-signal.

Through that this signal will be not damped and the printer knows that the ink beam doesn't hit the gutter.

Coding Service Manual

10.4 Basic operations

10.4.1 Cleaning process

Cleaning the nozzle closure

Requirement:

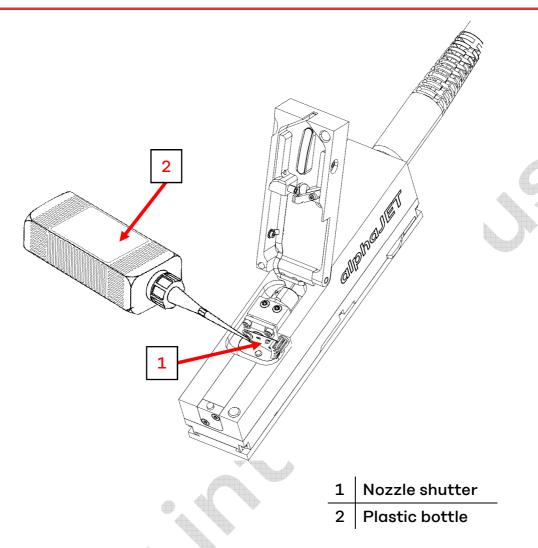
- Device is on.
- Ink is off.
- Print head is in a cleaning position.

Warning	Damage to the device or individual components!		
	Never dip the print head in solvent!Never clean the nozzle closure with hard or sharp objects!		

Warning	Damage to the device or individual components!			
	Never close the print head over a cleaning device filled with solvent! The print head lid must remain open! Reason: Closing the head lid automatically switches the high voltage back on again and can result in the ignition of any gases inside the print head.			

Caution	Injury to the eyes or hands!		
	 Always wear safety goggles and protective gloves when working on the print head and ink system! Protect eyes and skin from solvent and ink! 		

Coding Service Manual



Procedure:

- Hold the open print head with the inkjet outlet opening pointing downward, over a container.
- Flush the nozzle closure with solvent until the dried ink residue has dissolved.
- During the cleaning procedure, open and close the nozzle closure multiple times.
- After cleaning the print head, dry it with absorbent paper.

 Then switch on the ink jet to ensure that the jet path is clear.

Coding Service Manual

Flushing the gutter

Requirement:

Device is on, ink is on, print head is in a cleaning position.

Warning	Damage to the device or individual components!	
	Never dip the print head in solvent!	.6

Warning	Damage to the device or individual components!		
	 Never close the print head over a cleaning device filled with solvent! The print head lid must remain open! Reason: Closing the head lid automatically switches the high voltage back on again and can result in the ignition of any gases inside the print head. 		

CAUTION	Injury to the eyes or hands!
	Always wear safety goggles and protective gloves when working on the print head and ink system! Protect eyes and skin from solvent and ink!

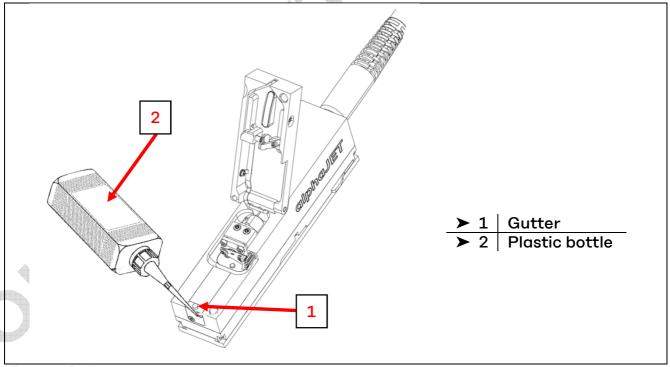


Figure 15 : Flush the gutter

Coding Service Manual

Procedure:

- 7 Switch the device off.
- After switching the device off, the suction pump continues to operate for about 2 to 3 minutes.
- 7 During this period, flush the gutter with solvent for about 10 seconds, to do so ...
- Hold the open print head with the inkjet outlet opening pointing downward, over a container.
- Drop solvent onto the gutter using a spray bottle.
- ➤ After cleaning the print head, dry it with absorbent paper.

Cleaning the print head

Requirement:

Ink is off, print head is in a cleaning position.

WARNING	Damage to the device or individual components!			
\wedge	Never dip the print head in solvent!			
**	Never clean the print head with hard or sharp objects!			

WARNING	Damage to the device or individual components!
	Never close the print head over a cleaning device filled with
	solvent!
LXX.	The print head lid must remain open! Reason: Closing the head lid
	automatically switches the high voltage back on again and can
	result in the ignition of any gases inside the print head.

CAUTION	Injury to the eyes or hands!
	Always wear safety goggles and protective gloves when working on the print head and ink system! Protect eyes and skin from solvent and ink!

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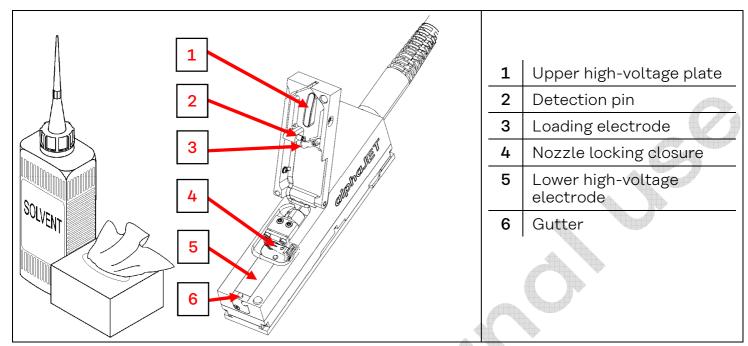


Figure 16: Cleaning the print head

Procedure:

For technical reasons, the print head is sensitive to dirt. It must therefore be regularly checked to make sure all its major working parts are kept clean.

Spray effects can easily lead to soiling of the print head.

- These deposits should be removed at regular maintenance intervals (at least once a week) before malfunctions can occur (SERVICE LED lights up).
- Use only a lint-free paper cloth dampened with solvent for cleaning purposes.
- For cleaning, use only the solvent prescribed for the ink in question.
- Switch the device off.
- Open head lid.
- Cleaning components:
 - Upper high-voltage plate (1).
 - Detection pin (2).
 - Charging electrode (3).
 - Nozzle closure (4).
 - Lower high-voltage electrode (5).
 - Gutter (6).
- The print head must be dried (or allowed to dry) thoroughly after it has been cleaned.

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11. Setting the ink beam

➤ CAUTION ➤ Injury to the eyes or hands! Always wear safety goggles and protective gloves when working on the print head and ink system! Protect eyes and skin from solvent and ink!

11.1 Adjusting the ink beam

Requirement:

- Device is switched on.
- Print head is in a cleaning position.

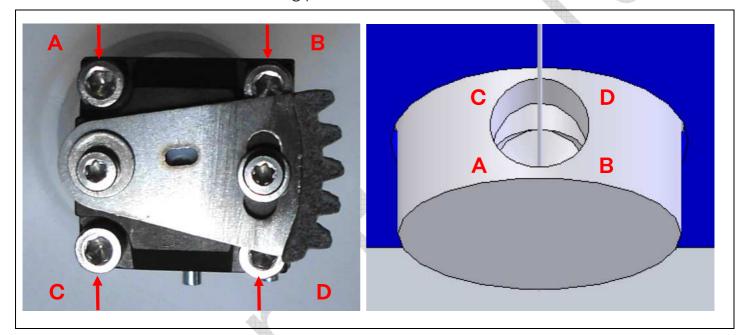


Figure 17: Adjusting the ink beam

Procedure:

The ink beam is adjusted using the four adjustment screws. When adjusting, make sure that the screws are neither overtightened (damage to the nozzle holder) nor undertightened (risk of leakage). If the angle of the jet is too severe, a new nozzle must be used. For alignment, it is recommended to remove the nozzle closure to get better access to all four screws.

The ink jet is adjusted using the 4 Allen screws in the nozzle plate. Carefully alternately first loosening one screw and then tightening the diagonally opposing screw allows the nozzle plate, and thus the ink jet, to tilt into the desired position.

Nozzle holder screws	Jet position change in the gutter when loosening	Jet position change in the gutter when tightening
Screw A	Jet towards screw D	Jet towards screw A
Screw B	Jet towards screw C	Jet towards screw B
Screw C	Jet towards screw B	Jet towards screw C
Screw D	Jet towards screw A	Jet towards screw D

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When making adjustments note that when moving the jet, both diagonally opposing screws must be used (e.g. loosening A and D tightening) to ensure that the holder is not damaged.

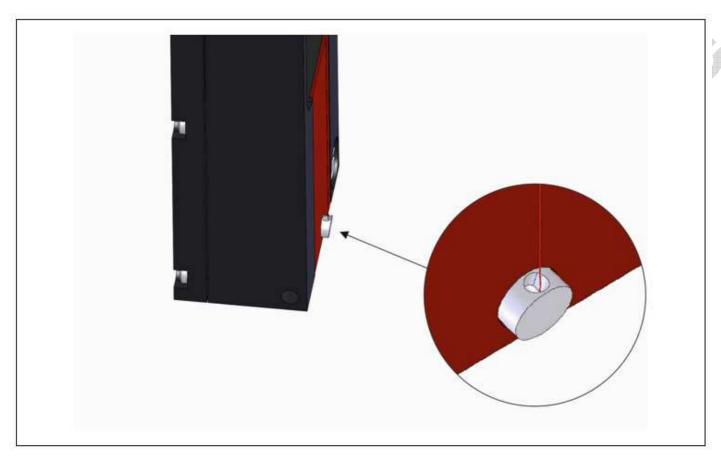


Figure 18: Jet position in the gutter

• The correct setting is centered with respect to the right and left print-head side and in the top third with respect to the direction of the head lid.

Note:

An adjustment of the jet position always makes it necessary to readjust the values for HVmin and HVmax and should be avoided if possible.

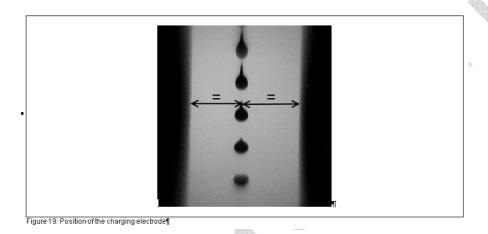
After a nozzle change, the general ink jet position must be re-adjusted.

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11.2 Adjusting the charging electrode (at upper deflection unit)

Requirement:

- Device is switched on.
- Ink beam is on.
- Print head is in a cleaning position.
- The ink beam must go through the middle of the charging electrode with the head closed.



Procedure:

- The correct position can be checked with the magnifying glass with the jet switched on
- To adjust the charging electrode, open the head lid.
- Loosen the fastening screw of the charging electrode some.
- Carefully slide the charging electrode into the desired position.
- Retighten the fastening screw.
- With the head closed, check the alignment of the jet and repeat the setting if necessary.

Coding Service Manual

11.3 Setting the modulation

Software setting

Requirement:

- Device is switched on.
- The ink beam is on.
- Print head is clean and closed.
- The ink chamber is vented.
- The viscosity is in the range +/- 25.
- The ink has not passed its expiration date.
- The device is at operating temperature.
- The continuous phasing option is activated in Menu → Ink system → Phasing.

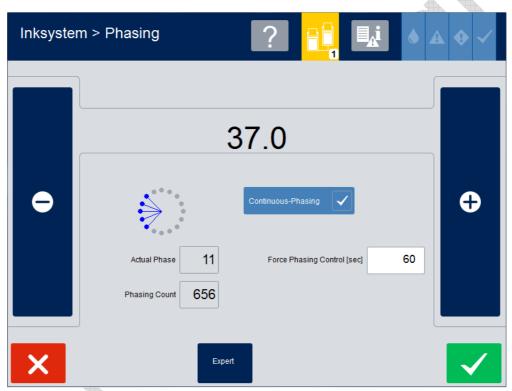


Figure 20: Ink system > phasing menu window

Procedure:

- Using the and + buttons, the currently displayed modulation voltage can be changed incrementally.
- Start with a modulation value of 5.
- Now increase it step by step (with the plus key) and at the same time, observe the circular display. The circle segments visible there change their position, at first anticlockwise, later clockwise.
- Increase the modulation until the circle segments change their direction. This is the so-called reversal point.
- Value range: Min.: 8 V; Max.: 80 V.

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11.4 Checking the droplet separation

Requirement:

- Device is switched on.
- The prescribed ink pressure is reached.
- Print head is clean and closed.
- The ink chamber is vented.
- The viscosity is in the range +/- 25.
- The device is at operating temperature.
- The ink beam is switched on, the ink beam positon is adjusted.

In practice, it can be recommended to set the modulation voltage a little below the reversal point (see chapter 11.3 Setting the modulation page 97), in order to safely prevent any possible over-modulation.

If you observe the ink jet through the inspection window in the print head, the ink jet should break up into drops of equal size.

The little flag at the drops must point upwards (toward the nozzle). The modulation voltage is too high if these point downwards. If no additional droplets form or long threads form between the droplets, the modulation voltage is too low.

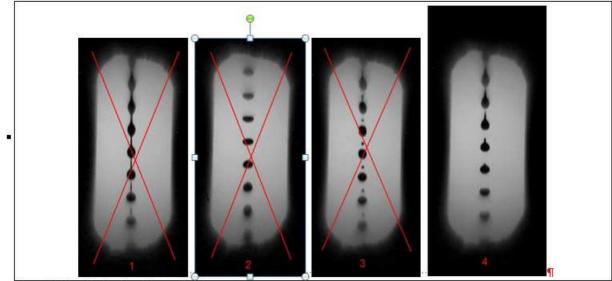


Figure 21: Checking the droplet separation §

• Figure 1: Modulation voltage too low.

• Figure 2: Modulation voltage too high (dirty nozzle, wrong viscosity).

Figure 3: Faulty, dirty nozzle.

Figure 4: Correct droplet separation.

Coding Service Manual

11.5 Adjusting the upper deflection unit

Requirement:

- Device is switched on.
- Ink is on.
- Print head is in a cleaning position.

With the print head closed, the droplet separation position (dashed line) must be visible in the top third to the middle of the magnifying glass.

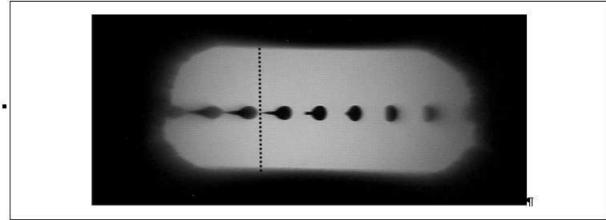


Figure 22: Position of the deflector

- This can be checked with the magnifying glass with the ink beam switched on.
- To adjust the upper deflection unit, open the head lid.
- Loosen the 2 fastening screws of the deflector some.
- Slide the upper deflection unit in the necessary direction.
- Retighten the mounting screws.
- Make sure that the head lid closes freely.
- With the head closed, check the position of the droplet separation and repeat the setting if necessary.

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11.6 Setting HVmin / HVmax

Requirement:

- Device is switched on.
- The prescribed ink pressure is reached.
- Print head is clean and closed.
- The ink chamber is vented.
- The viscosity is in the range +/- 25.
- The device is at operating temperature.
- The ink beam is switched on, the ink beam positon is adjusted.

To check the print-out, the print text **HV-adjustment.txt** is used in print mode PM 24 (24 pixels high, normal quality).

To improve assessability of the print-out, the distance from the print-head to the base should be relatively large (approximately 25 mm).

The setting of the minimum and maximum deflection voltage (HVmin and HVmax) is performed as follows:

11.6.1 Setting HV min

Procedure:

- In the Configuration menu, set a print height of 1%.
- In the Setup submenu, enter an ink pressure offset of 350 mbar.
- Establishing readiness for printing.
- Perform test prints and while doing so, reduce the value of HVmin in the Setup submenu (in 100 V increments) until the bottom point line (double line) just starts to no longer be printed correctly and instead hits gutter B (see Figure **Setting HVmin**).

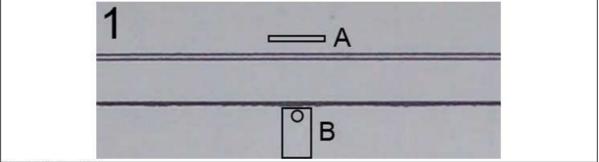


Figure 23: Setting HVmin

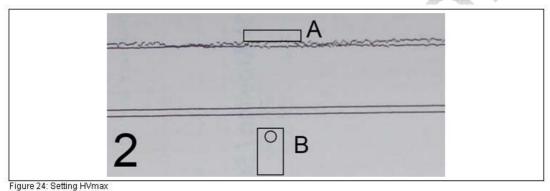
The value now determined is the correct value for Hvmin.

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11.6.2 Setting HV max

Procedure:

- In the Configuration menu, set a print height of 100%.
- In the Setup submenu, enter an ink pressure offset of -150 mbar.
- Establishing readiness for printing.
- Perform test prints and while doing so, increase the value of HVmax in the Setup submenu (starting with 5500V in 100V increments) until one of the following conditions occurs first:
- The max value of 6200V is reached (higher values may cause flashover).
- The top line (double line) just starts to no longer be printed correctly because the jet hits the top deflector electrode A (see Figure **Setting HVmax**).



• This determined value is the correct value for HVmax

After the adjustment, the ink pressure offset is reset to 0. The following print images then result:

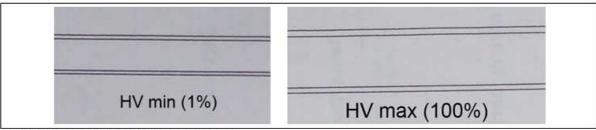
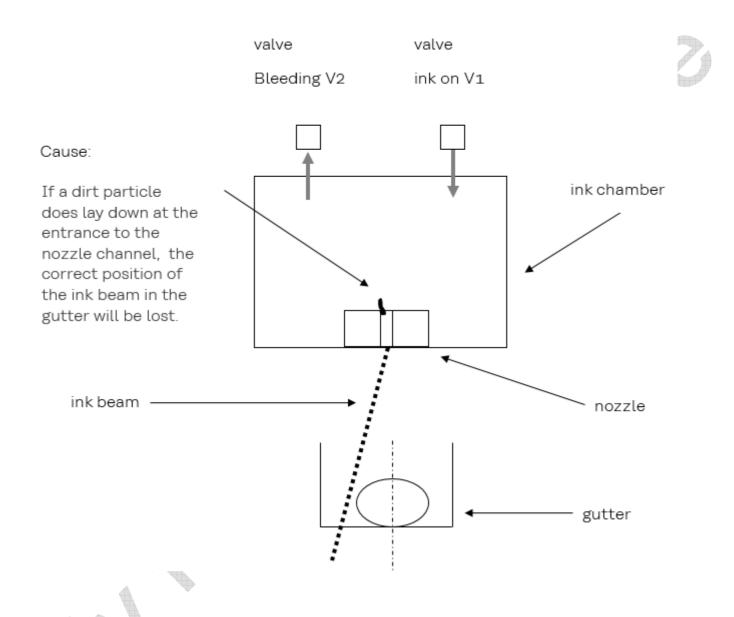


Figure 25: Correct print out with HV=1% and HV=100%

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11.7 Function Nozzle cleaning (Menu ink system)



This function cleans the nozzle from ink incrustations or dirt particles. While the ink (ink valve V1) is periodically switched on and off, through the open valve V2 (bleeding) the ink is sucked back from the ink chamber to ink system.

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- Open the print head.
- Close the gutter with the gutter closure and clamp an absorbent lint-free paper towel in front of the nozzle.



- Activate the function Nozzle Cleaning.
- Switch off the function Nozzle Cleaning (duration of the procedure approx.
 5 10 minutes, manual shutdown required).
- Then observe the ink beam: if the ink beam again constantly hits the gutter, no further action is required, if necessary repeat the procedure.
- Clean contaminated areas with solvent.

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11.8 Function Rinse Nozzle (Menu ink system)

Manually cleaning of the nozzle of the chosen print head by purging and sucking off the deposits inside the ink chamber:



- Open the print head.
- Switch off the ink beam.
- Close the gutter using the gutter locking closure in order to increase the suction effect via valve V2 to the ink chamber.
- Hold the print head vertically up, open the print head lid and drip solvent on the plate of the nozzle.
- Activate the function **Rinse nozzle**.

 The solvent will be sucked in through the nozzle and any deposits in the nozzle will be dissolved and sucked off (duration about 5 seconds).
- Deactivate function **Rinse nozzle** (if necessary repeat procedure).
- Remove gutter closure.

If the measures **Nozzle Cleaning** and **Rinse Nozzle** do not lead to the desired success, all that remains is to remove the soiled nozzle together with the ink chamber and to clean it in an ultrasonic bath or to replace it with a clean nozzle.

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12 Print head repairs

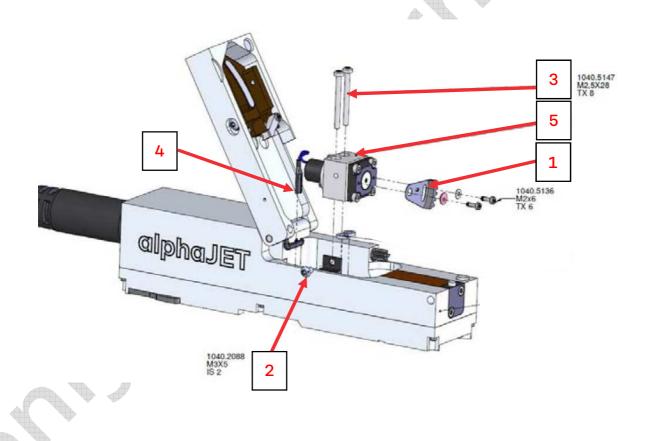
12.1 Removing the ink chamber

Requirement:

- The ink system does not need to be emptied.
- The print head must be positioned above the control housing.

Procedure:

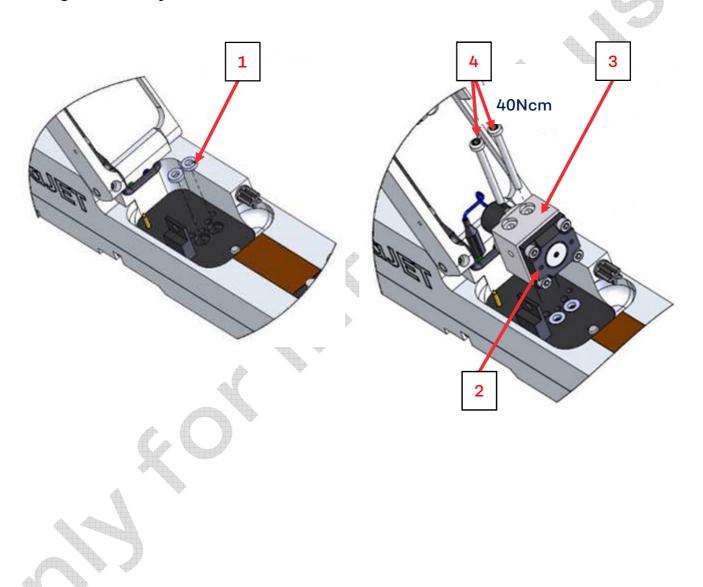
- Dismantle the nozzle shutter and put it aside, or move the nozzle shutter to the up position (see chapter 12.3.2 Dismantling the nozzle shutter page 111) (1).
- Unscrew the fastening screw of the head heater (2).
- Loosen the two fixing screws of the ink chamber (3).
- Pull off connection cable (4).
- Carefully pull off the ink chamber (5).



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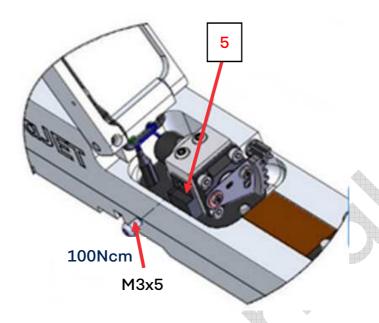
12.2 Mounting the ink chamber

- Use new **sealing shims 1039.1746** for ink chamber and watch for the correct position when you mount the new chamber (1).
- Disassemble the nozzle shutter from the ink chamber if not yet done (2).
- Place the ink chamber on the mounting plate (3).
 Important: The guide is fixed via the two notched pins!
- Tighten the 2 cylinder head screws with 40 Ncm (4).



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• Fix the heating resistor to the ink chamber with 100Ncm (5).



Warning	Damage the device
	7 Tighten the 2 cylinder head screws with the max. torques 40 Ncm.

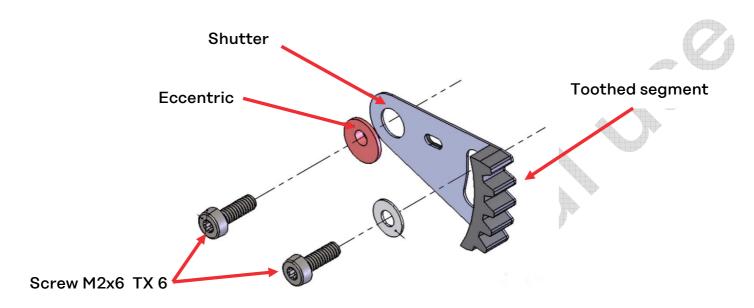




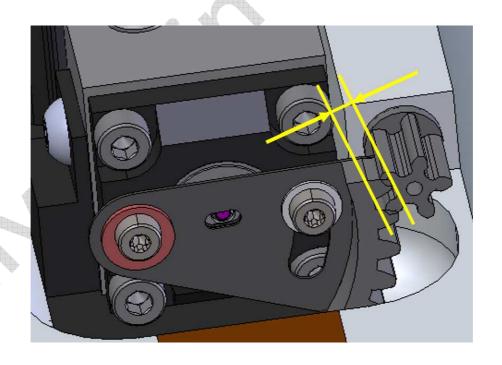
After installation, vent the ink chamber, set ink beam, set modulation and check these settings on the running device multiple times (test run, test pressures).

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12.3 Installing and removing the nozzle shutter Components of the nozzle shutter



The position of the eccentric determines the distance between the toothed segment and the gear wheel of the nozzle shutter.

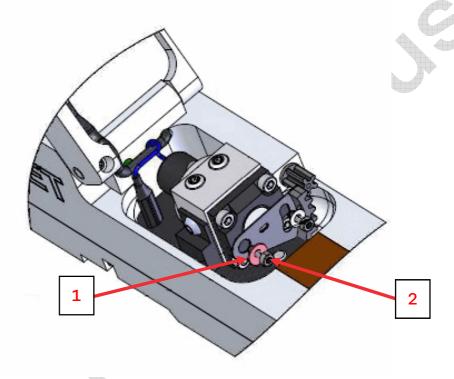


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Procedure:

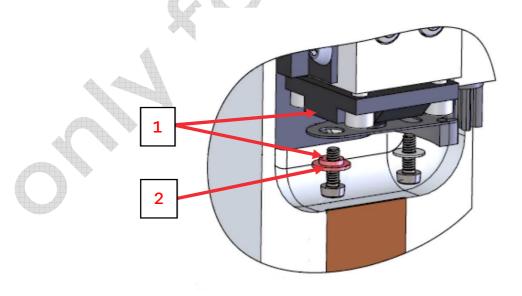
- Wet the contact surface of the eccentric with approx. one drop of Loctite 638 (1).
- Insert the eccentric together with the screw through the large hole and screw it to the ink chamber (2).

Important: The shutter/slider must be open, i.e. touching the mounting plate (almost) if necessary.



Control / Important:

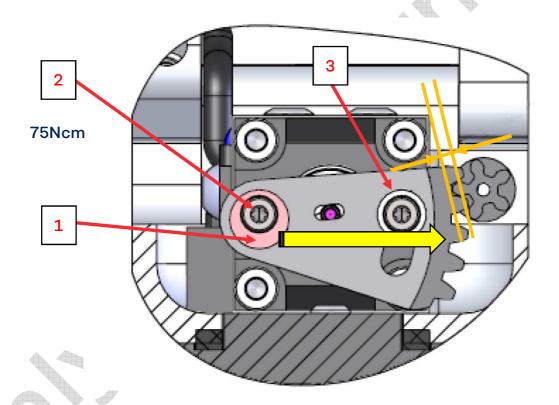
Only the contact surface may be wetted (1). The running surface of the slider must not have any adhesive residue (2)!



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12.3.1 Installation of the nozzle shutter

- Turn the eccentric (left) to the right so that the slider has only minimal play (1).
- Tighten the cylinder screw of the eccentric with 75Ncm (2).
- Place the washer on the remaining screw (right) and wet the thread with a drop of Loctite 542 (3).
- Pull the slider slightly forward and tighten the (right) screw so that the slider bends only slightly.
- Important: After tightening the shutter (steps 2 & 4), the shutter must still be movable (that means slight play)!



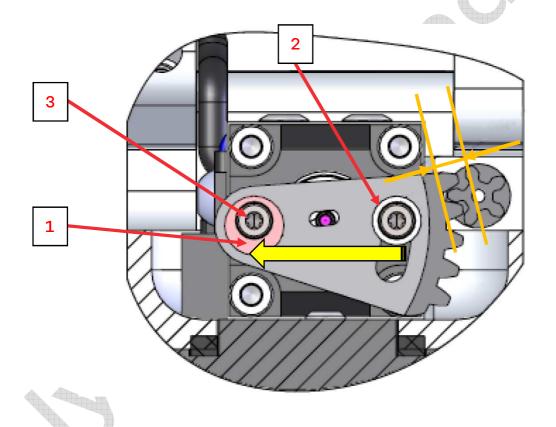
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12.3.2 Dismantling of the nozzle shutter

Turn the eccentric (left) to the left so that the slider moves away from the shaft and is at approx. maximum distance (1).

Unscrew the right screw together with the washer and fold the toothed segment away to the left (2).

Pull the slider slightly forward and loosen the (left) screw on the eccentric (3).



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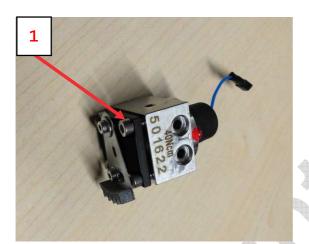
12.4 Nozzle change

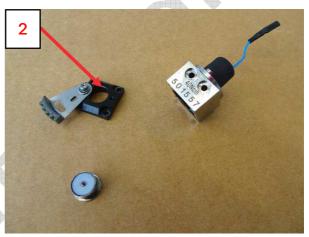
Requirement:

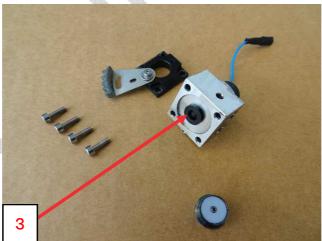
• Ink chamber has been removed.

Procedure:

- Unmount the ink chamber (see chapter 12.1 Removing the ink chamber page 105).
- Remove the four adjusting screws of the nozzle holder (1).
- Push the nozzle out of the holder (2).
- Use a new seal when reassembling (3).
- Reassemble in reverse order.
- Adjusting the ink beam (see chapter 11.1 Adjusting the ink beam page 94).







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12.4.1 Cleaning the nozzle

Requirement:

- Ink chamber has been removed (see chapter 12.1 Removing the ink chamber page 105).
- Nozzle has been removed out of the ink chamber (see chapter 12.4 Nozzle change page 100).

Procedure:

- Lay the nozzle into a case filled with solvent and put it into an ultrasonic bath.
- The duration of the cleaning should be at least 10 minutes.
- Then blow the nozzle dry with clean compressed air and visually inspect.
- If there is suspicion that there is still residue in the nozzle after cleaning with solvent, repeat the cleaning procedure in the ultrasonic bath with warm water.
- Then blow the ink nozzle dry with clean compressed air.



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12.5 Unmounting the rear plate

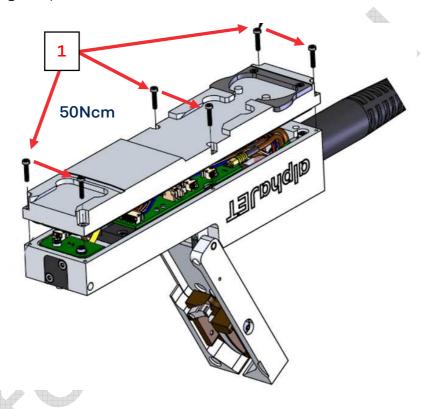
Requirement:

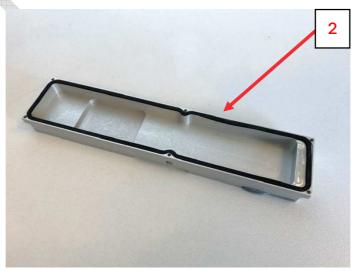
- The ink system does not need to be emptied.
- Device is switched off.

Procedure:

Remove the six screws M2x10 TX 6 of the rear plate and remove the plate (1).

- Reassemble in reverse direction, use a new seal and watch for the right position of the seal (2).
- The tightening torque for the screws is **50Ncm**.





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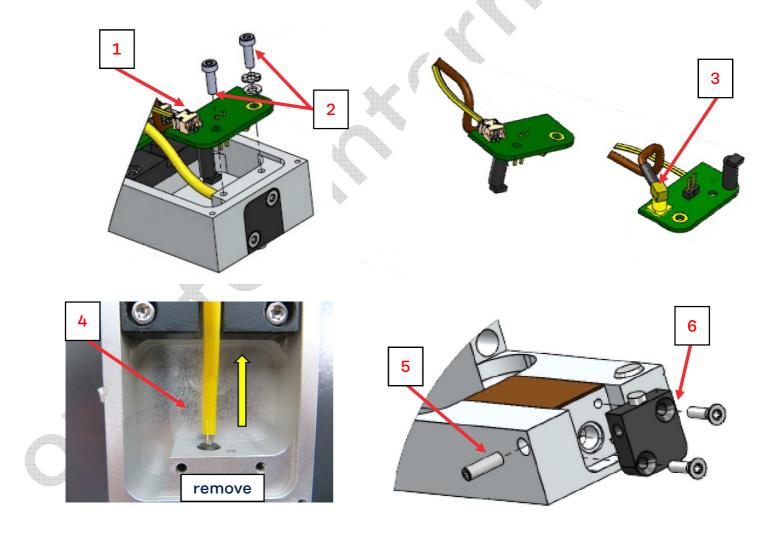
12.6 Exchange of the gutter

Requirement:

- The ink system does not need to be emptied.
- Device is switched off.
- Rear cover plate is dismantled (see chapter 12.5 Unmounting rear plate page 114).

12.6.1 Dismantling the gutter

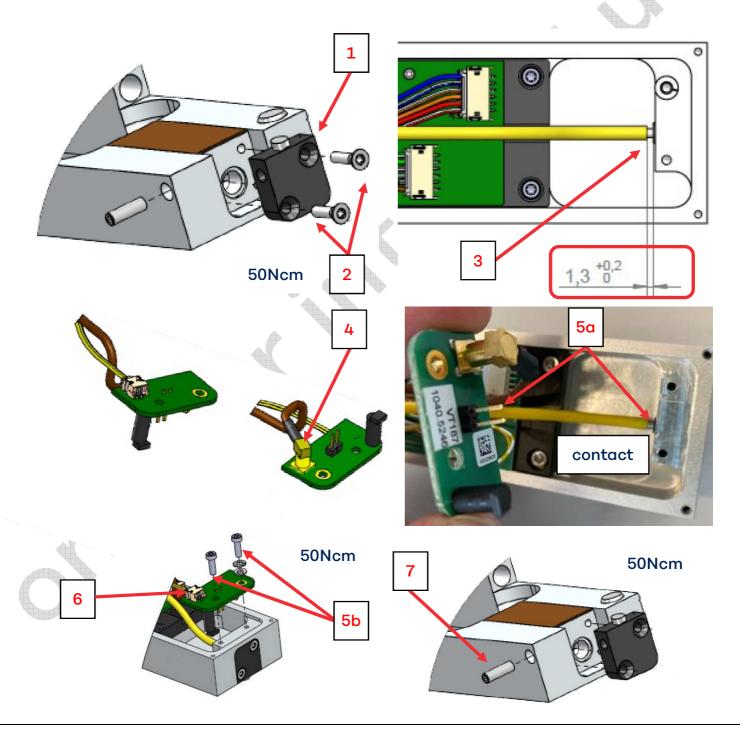
- Disconnect the connector (head open cable) on the top of the gutter board (1).
- Unscrew gutter board and pull from return sensor (2).
- Pull off coax connector (reflow sensor) (3).
- Pull off the return hose from the reflow sensor (4).
- Remove grub screw from the side of the print head housing (5).
- Remove screws on gutter module and pull off module (6).



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12.6.2 Installing the gutter

- Install new gutter module as indicated in the figure (1).
- Fasten the screws with 50Ncm (2).
- Push return hose onto return sensor Note: A gap of 1.3 to 1.5mm must remain to the plastic (3).
- Plug on coax connector (reflow sensor) (4).
- Plug gutter board onto return sensor (5a). and screw on again with 50Ncm (5b). Note: the two pins must be in contact with the metal gutter during installation!
- Reconnect connector (head open) on top of gutter board (6).
- Screw in the grub screw on the side of the print head housing again with 50Ncm (7).



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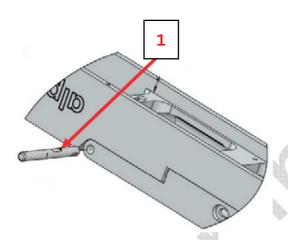
12.7 Changing the head flap

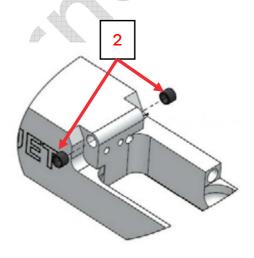
Requirement:

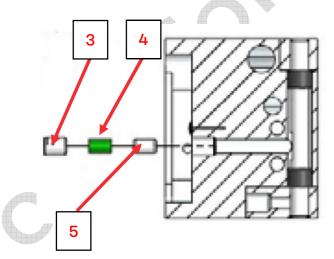
- The ink system does not need to be emptied.
- Device is switched off.

Components of the head flap

1	Cylindrical pin 1040.5977
2	Plain bearing bush 1040.3418
3	Grub screw M4x5 1009.2830
4	Spring element 1040.3938
5	Cylindrical pin 1040.3433



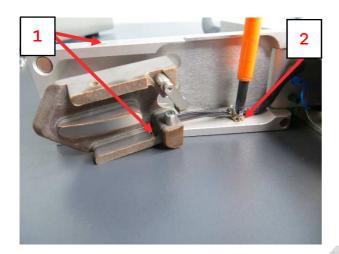


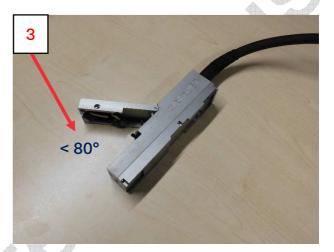


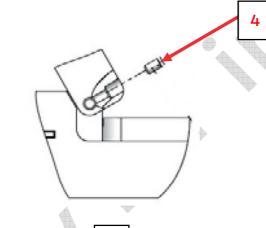
Coding Service Manual

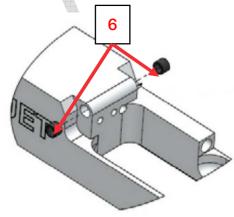
12.7.1 Dismantling the print head flap

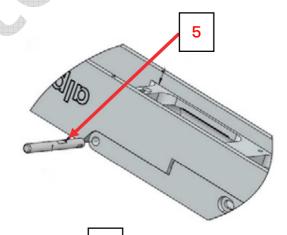
- Remove the upper deflection unit from the flap by loosening the screws (1) and remove the ground connection (2).
- Move head flap out of the grid (noticeable) Opening angle < 80° (3).
- Loosen the grub screw (4).
- Remove cylindrical pin (5).
- Insert new plain bearing bushes if necessary (6).
- Replace spring element (7).

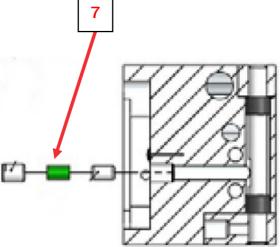








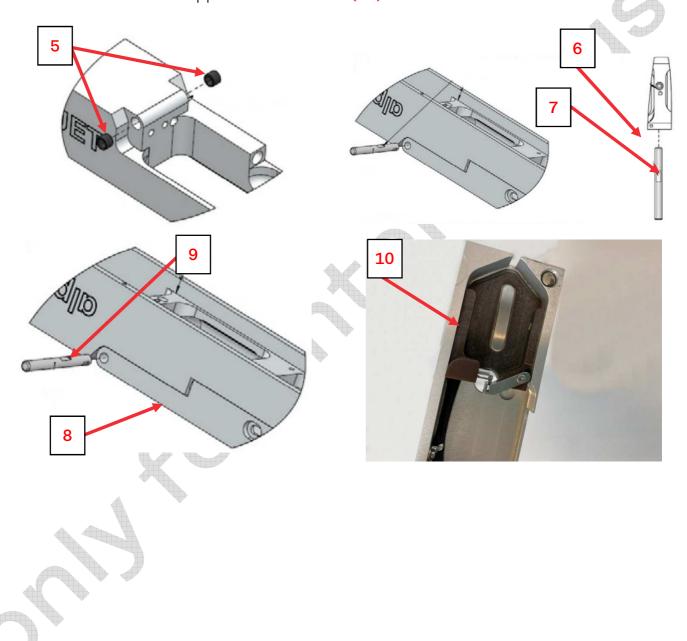




Coding Service Manual

12.7.2 Installation of the print head flap:

- If necessary, press two plain bearing bushes flush into the print head base housing. (5).
- Pay attention to the correct surface to bore alignment! (6).
- Measure the 3.5 dimension of cylindrical pin 1040.5977 (7).
- Place a 1040.5981 head flap on the print head base housing and close it (8).
- Insert a cylindrical pin 1040.5977 (machined) with the surface facing the bore. If necessary, mark the face of the pin as an alternative (9).
- Reassemble the upper deflection unit (10).



Coding Service Manual

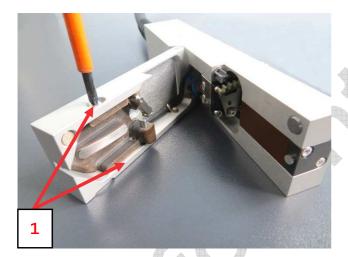
12.8 Changing the upper deflection unit

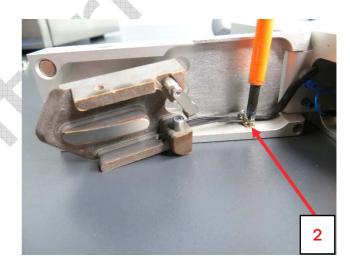
Requirement:

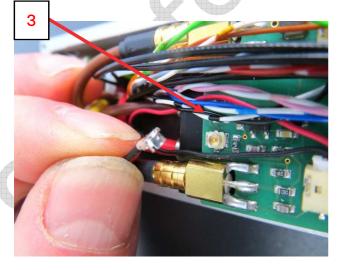
- The ink system does not need to be emptied.
- Device is switched off.
- Rear cover plate is removed (see chapter 12.5 Unmounting the rear plate page 114).

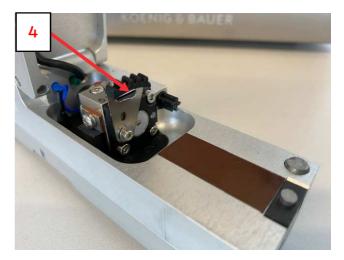
12.8.1 Procedure for dismantling the upper deflection unit:

- Loosen the upper deflection unit from the flap by removing the lateral screws (1).
- Remove the ground connection (2).
- Disconnect the detection cable from the Soldering assembly (3).
- Unhook the nozzle shutter upwards; only loosen the screw on the gear rim! (4).



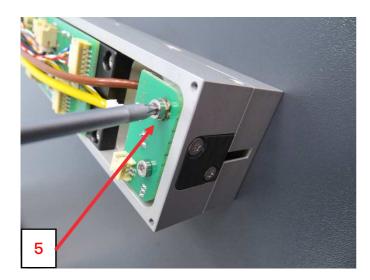


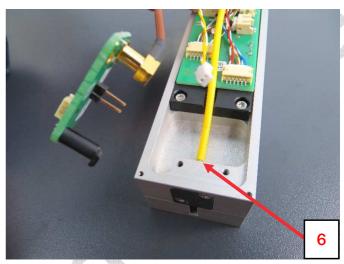




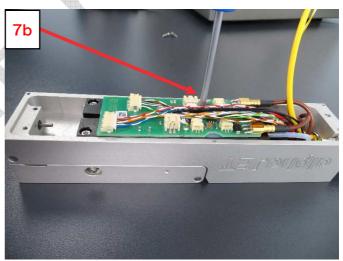
Coding Service Manual

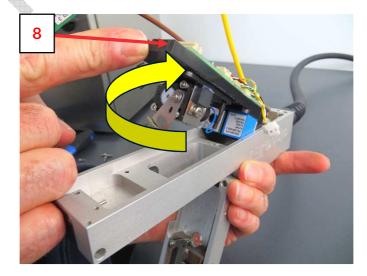
- Loosen gutter board and gutter hose (5 +6).
- Remove the 3 screws of print head module (7a + 7b).
- Tilt the print head module out downward toward the head tube without breaking off the nozzle shutter (8).





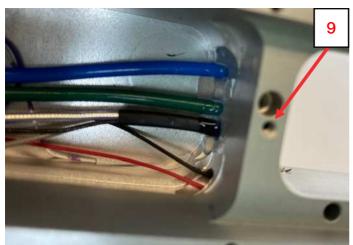


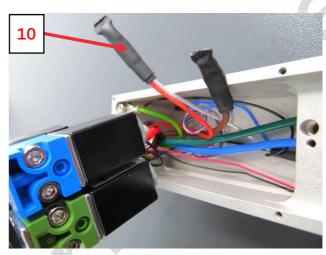


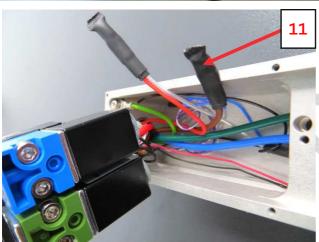


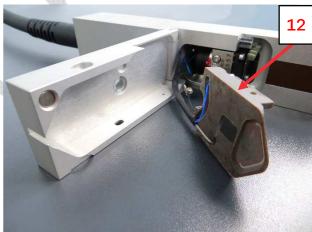
Coding Service Manual

- Loosen the screw for the ground cable (9).
- High-voltage cable: Uncover connection and unsolder (10).
- Charge cable: Uncover connection and unsolder (11).
- Remove upper deflection unit (12).





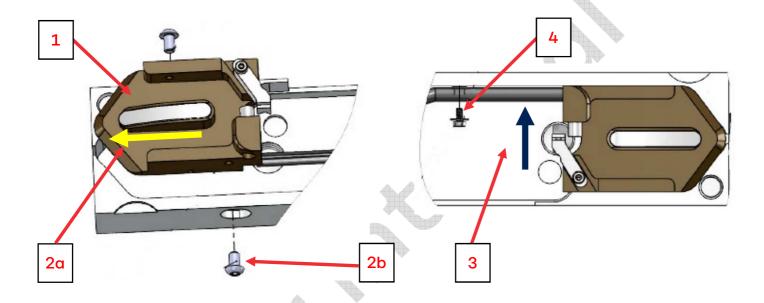




Coding Service Manual

12.8.2 Installing the upper deflection unit:

- Insert the upper deflection unit flat into the head flap. (1).
- Press the deflection unit in the direction of the outlet slit (2a) and fix it in place with 2 M3x5 flat-head screws (2b).
 - Note: Slightly hand-tight is sufficient because of later adjustment.
- Press the cable of the deflection unit against the edge of the head flap (3).
- Place the soldering lug on the toothed lock washer and cable (4).
- Fasten the soldering lug of the ground with the cylinder head screw M2x4. Important: When fastening the ground, make sure that the soldering lug is over the cable and that it is pressed into the edge of the head flap.

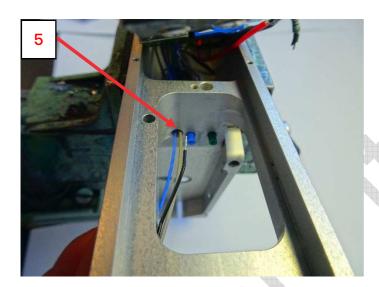


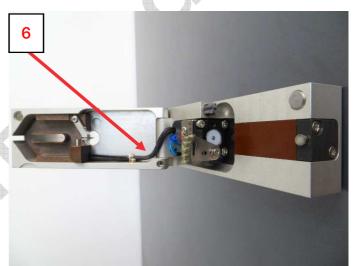
Coding Service Manual

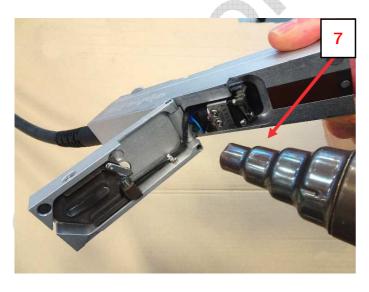
- Thread the cable package through the hole (5).
 Note: First pull through the coaxial cables with plugs.
- Open the print head flap completely and, if necessary, relieve the cable of any tension (6). Important: The cable must remain in the original guiding!
- Close the head flap, press the cable against the head flap wall and heat it slightly with the hot air gun (7).
- Seal the cable from the inside of the housing with silicone (silicone Wacker Elastosil E43) (8).



Important: No silicone may leak in the front area!





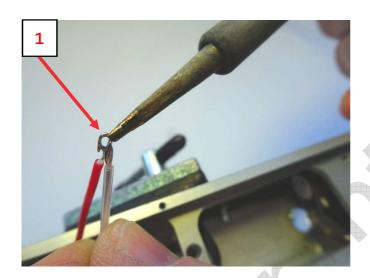


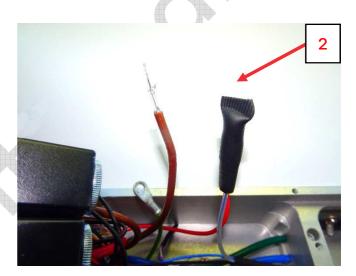


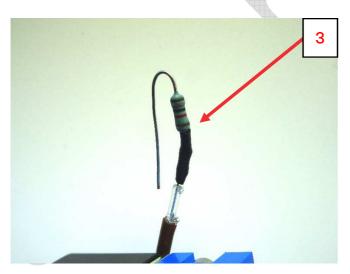
Coding Service Manual

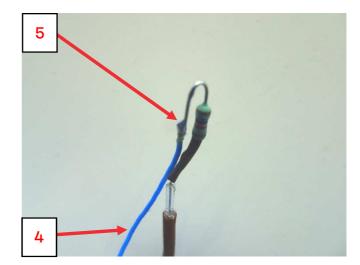
Installing the cables inside the print head housing

- Solder the red cable from print head hose to the coaxial cable of the upper deflection unit (1).
- Insulate the soldered joint several times with heat shrink tubing (2).
- Solder the 18 k Ohm resistor to the brown coaxial cable **2CV** and pull the heat shrink tubing forward until the ceramic body of the resistor is completely covered, then shrink (3).
- Put the heat shrink tubing on the blue cable of the upper deflection unit (4).
- Bend the resistor as shown and solder it to the blue charge cable of the upper deflection unit (5).
- Place the heat shrink tubing 1040.2087 over both cables including soldering and shrink
 (6).



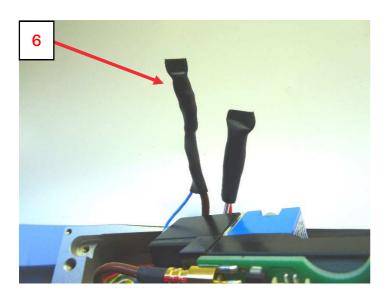


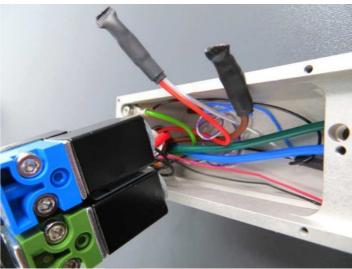




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12.8.1 HV – cable and Charge cable





HV - cable

Important:

Please use an shrink tubing with internal adhesive (e.g. from company Panduit).



Charge cable

Important:

Change the resistor (18 kOhm).



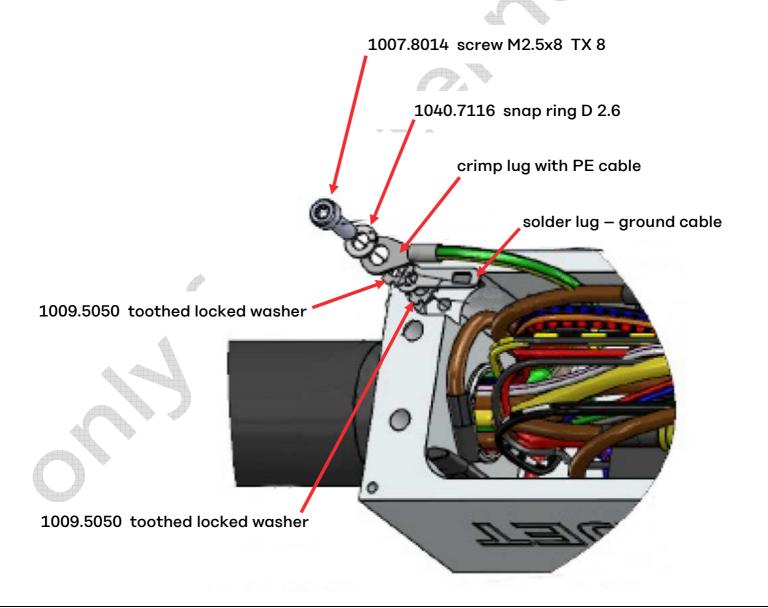
Coding Service Manual

- Solder the black ground cable from the upper deflection unit to solder lug 1037.4779.
- Sequence of components from the screw head:

snap ring crimp lug with PE cable toothed lock washer solder lug - ground cable toothed lock washer

Slide all parts onto the screw.

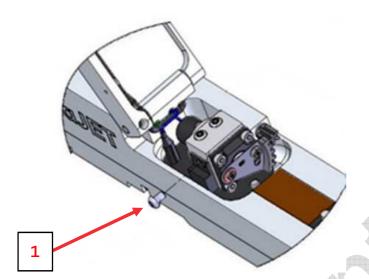
Screw the assembled cable package to the housing and tighten with 0.75Nm.

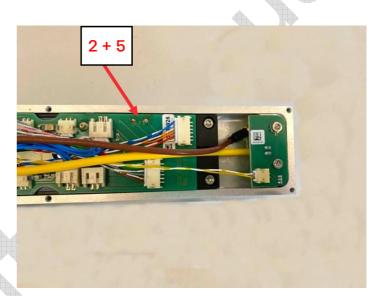


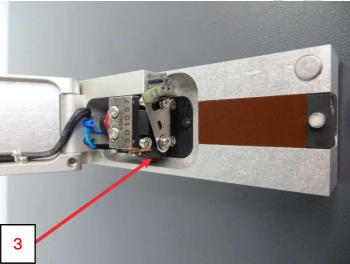
Coding Service Manual

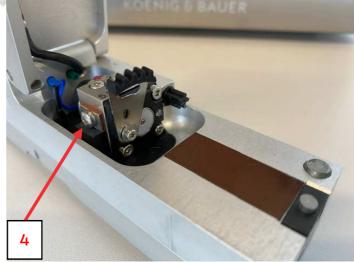
12.9 Changing the heater resistor

- Unmount the rear plate (see chapter 12.5 Unmounting the rear plate page 114).
- Loosen the screw of the heater resistor (1).
- Unsolder the two pins of the resistor on the PCB (2).
- Mount a new resistor and seal it with instant glue (3).
- Fasten the screw of the heating resistor (4).
- Solder the pins of the resistor on the PCB (5).
- Mount the rear plate.









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12.10 Exchange of valve V2 and valve V5

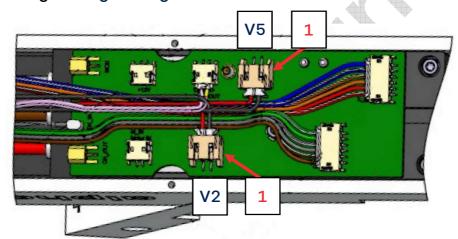
Requirement:

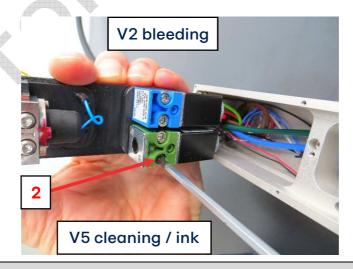
• Switch off printer.

Procedure:

- Remove print head module (see chapter 12.11.1 Dismantling the print head module page 130).
- Place the print head higher than the controller.
- Disconnect the valve electrically (1).
- Remove the screws of the valve and take it off (2). Note: Collect ink residues with an absorbent cloth
- Put on the new valve and screw it on (Seal must be properly installed) **CAUTION:** Do not overtighten plastic thread!
- Reinstall the print head module

V2 bleeding grey / grey-white V5 cleaning / ink green / green-white







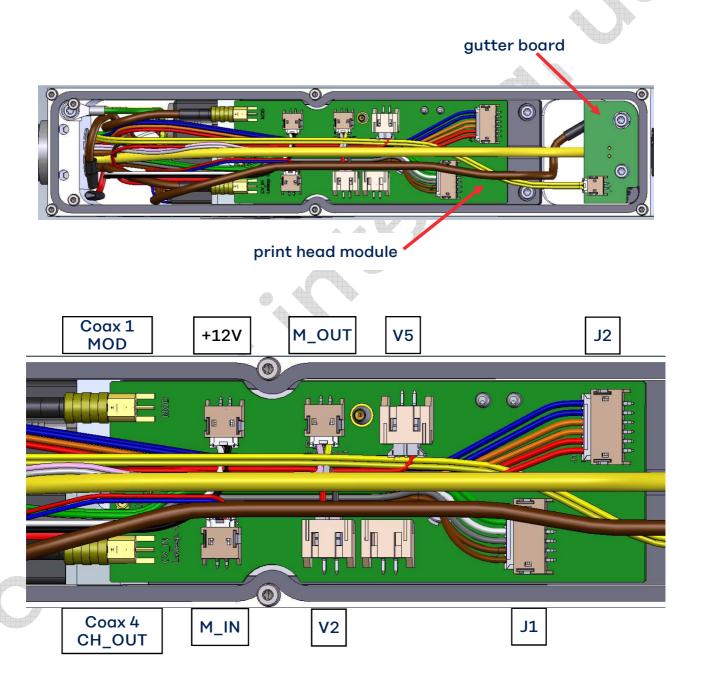
A small amount of ink may escape when loosening the connections.

Coding Service Manual

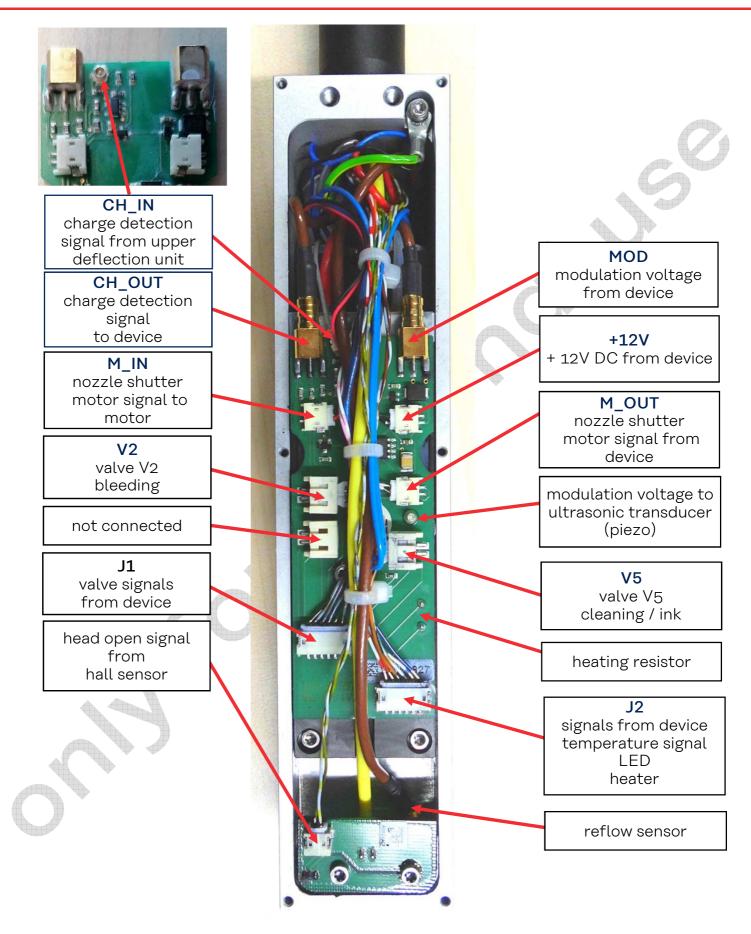
12.11 Changing the print head module

12.11.1 Dismantling the print head module

- Dismantle the nozzle shutter (see chapter 12.3.2 Dismantling of the nozzle shutter page 111).
- Dismantle the ink chamber (see chapter 12.1 Removing the ink chamber page 105).
- Disconnect all connection cables at the board



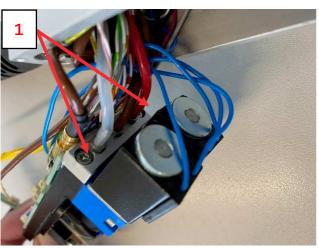
Coding Service Manual

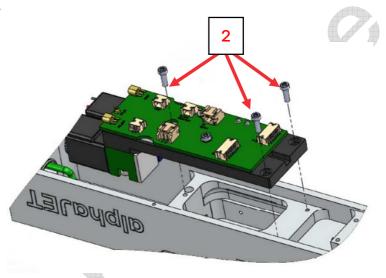


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- Unscrew the hose connection block and fold it away to the rear (1).

 CAUTION: The hoses must not be kinked! the PCB while pushing out the LED of the isolation plate.
- Remove all three screws from the print head module (2).
- Replace the print head module (3).









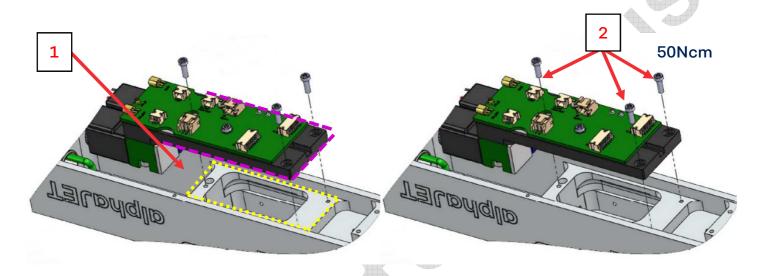
Note: Separation of ink tubes only over the complete connection block, never pull off individual tubes.



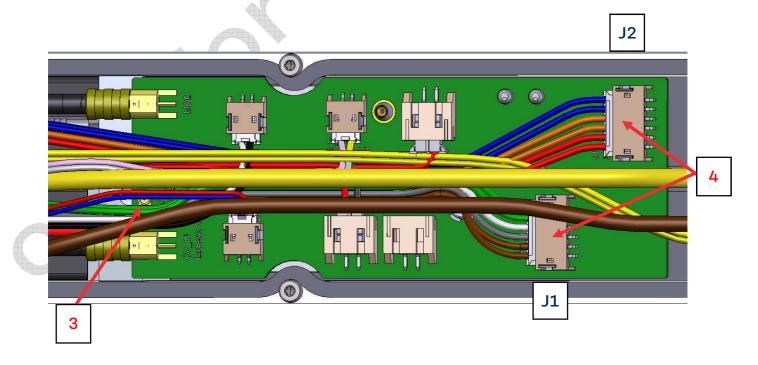
Coding Service Manual

12.11.2 Installing the print head module

- Thread the solder assembly pedestal into the pocket from the print head housing and press into place (1).
 - **Check:** The surface of the mounting plate must be flush and parallel to the print head housing pocket.
- 3x Tighten cylinder head screw with **50Ncm (2)**.



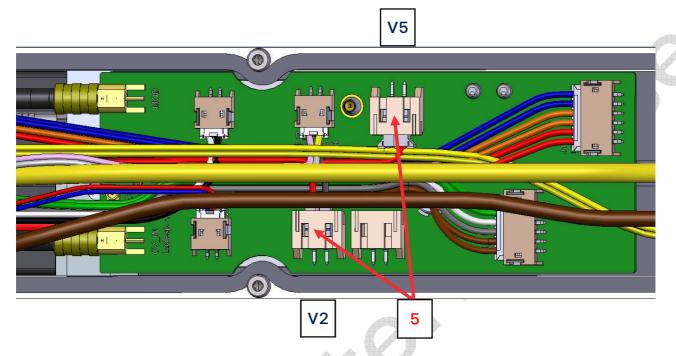
- Reconnect all connection cables to the module.
- Route the detection cable around the valves and connect it (3).
- Center the 6-pin cables and connect them to connectors J1 and J2 as shown (4).



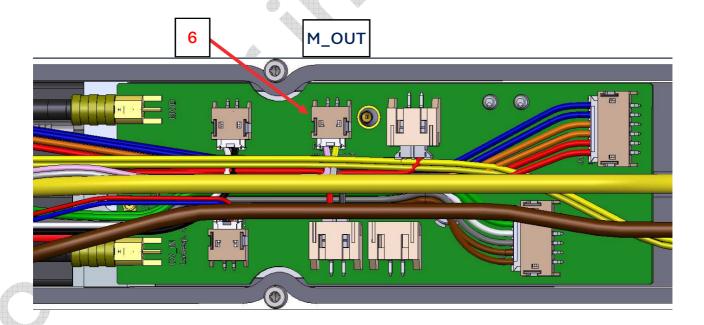
Coding Service Manual

Connect the valve cables as shown (5).

V2 bleeding grey / grey-white V5 cleaning / ink green / green-white

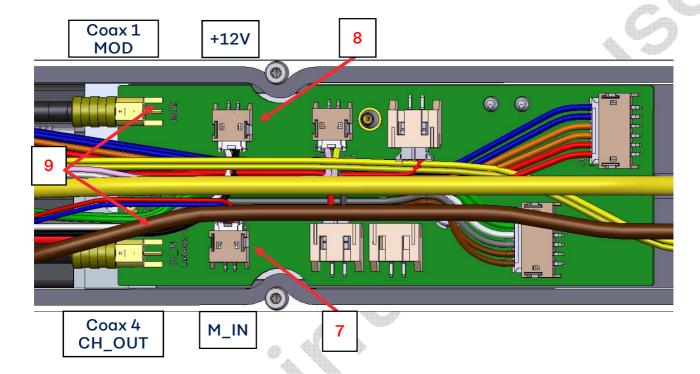


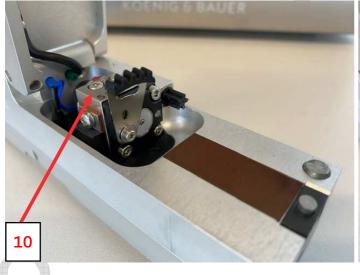
 Connect M_OUT (Motor_OUT = nozzle shutter motor signal from device) pink / pink-white (6).

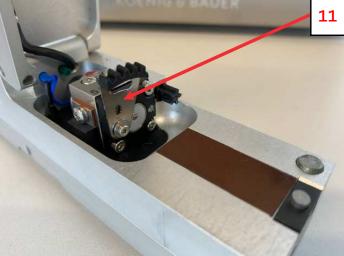


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- Lay/lead the cable for **M_IN** (Motor_IN = signal to nozzle shutter motor) **red / blue** as shown over the remaining cables and connect (7).
- Lay/lead the cable for **+12V DC** from device **black / black-white** over the remaining cables and connect (8).
- Connect the coaxial cables 1 MOD and 4 CH_OUT (charge detect out) as shown (9).
- Reassemble the ink chamber and nozzle shutter (10 + 11).





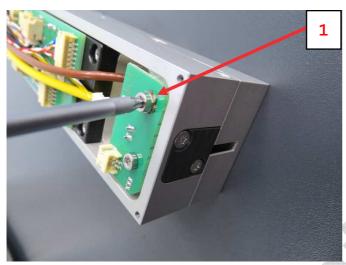


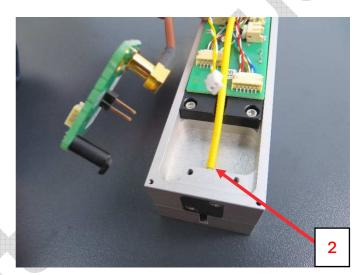
Coding Service Manual

12.13 Nozzle shutter motor

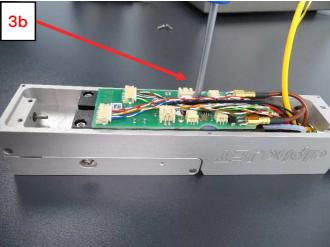
12.13.1 Dismantling the nozzle shutter motor

- Dismantle the nozzle shutter and put it aside, or move the nozzle shutter to the up position (see chapter 12.3.2 Dismantling the nozzle shutter page 111).
- Unmount the rear plate (see chapter 12.5 Unmounting the rear plate page 114).
- Loosen gutter board and gutter hose (1 +2).
- Remove the 3 screws of print head module (3a + 3b).



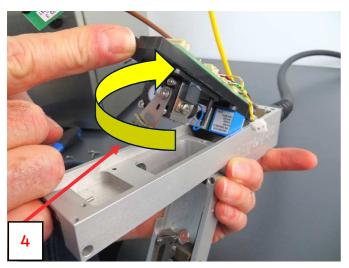


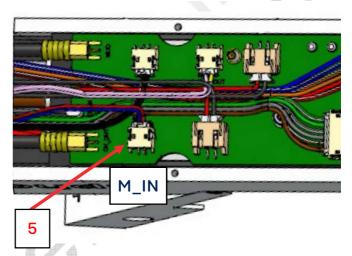


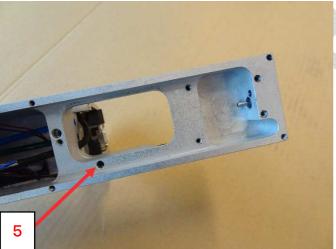


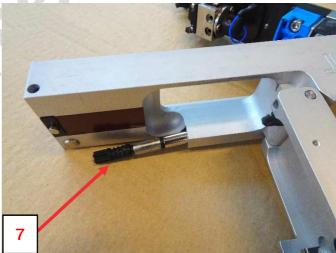
Coding Service Manual

- Tilt the print head module out downward toward the head tube without breaking off the nozzle shutter (4).
- Disconnect motor on print head module electrically (5).
- Remove grub screw (6).
- Express motor (7).









Coding Service Manual

12.13.2 Installing the nozzle shutter motor

Note: The cables tend to break quickly at the base!

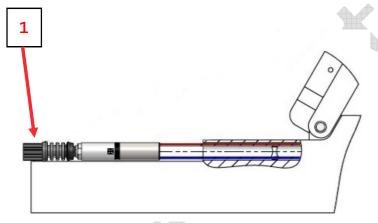
- Generously smear the fins of the printed shaft with grease (1040.7379) (1).
- Insert the drive unit (1040.5979) flush into the print head base housing (2). Important: The drive unit must be able to rotate freely in the end position!
- Turn the drive unit on the gearwheel back and forward approx. 3 5 times by hand (3)!

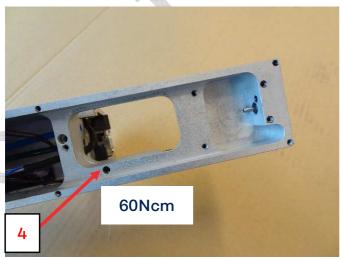
Function / quality test

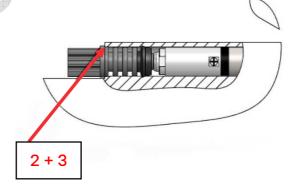
The collar must rest on the housing or on the bore surface and must not rest or drag on the lower surface (3).

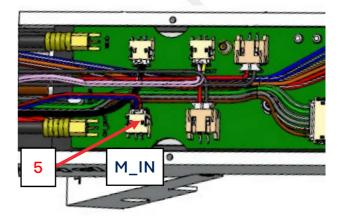
The rotation of the drive unit should ideally be uniform. In case of noticeably strong irregularity, check the concentricity and the dimensions again!

- Fix the drive unit with a grub screw M3x5 with 60Ncm (4).
- Connect motor on print head module electrically (5).
- Reassemble the print head module, the rear plate and the nozzle shutter (see chapter 12.11.2 Installing the print head module page 133), (see chapter 12.3.1 Installation of the nozzle shutter page 110).





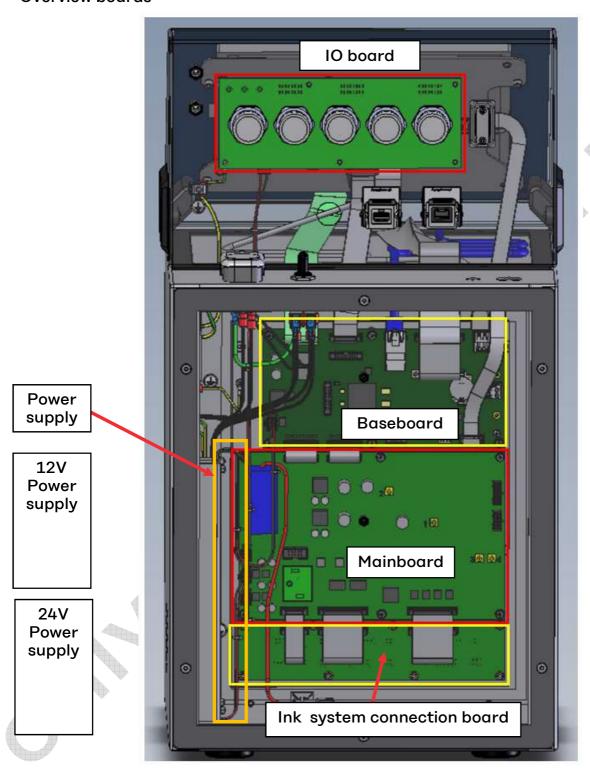




Coding Service Manual

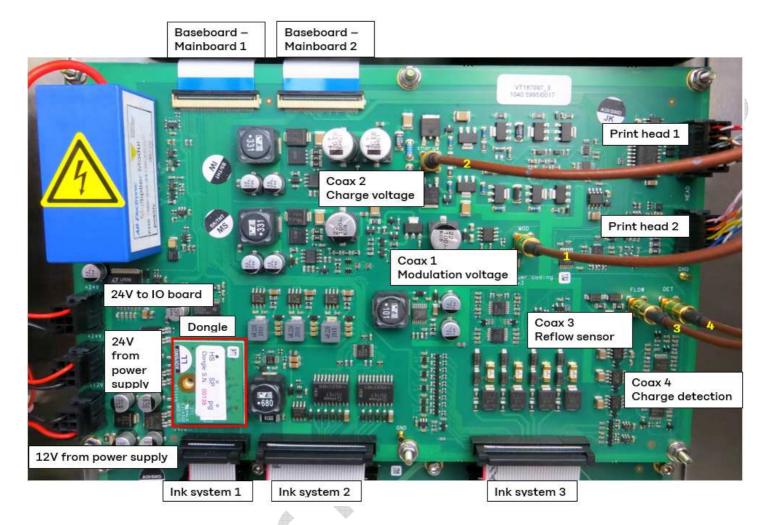
14. Electronic

Overview boards



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14.1 Mainboard connectors

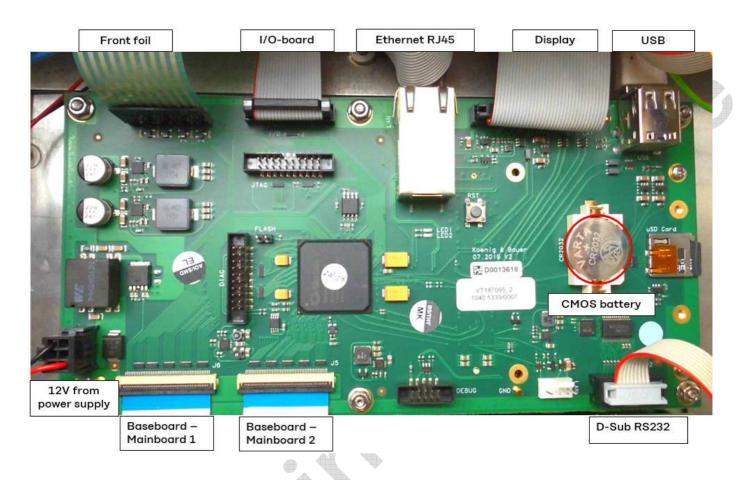


Coax cables

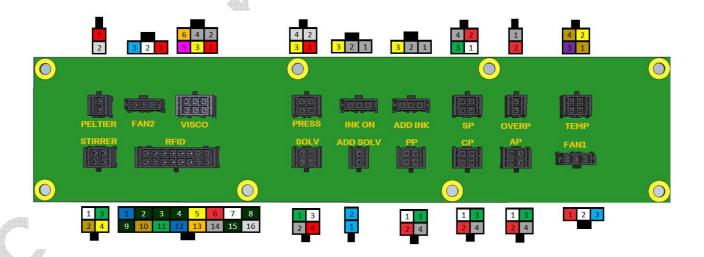


Coding Service Manual

14.2 Baseboard connectors

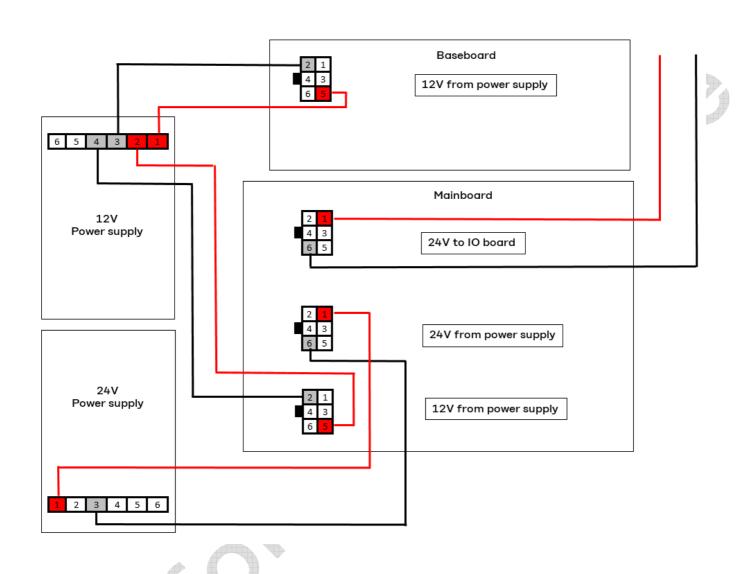


14.2 Connection board ink system connectors



Coding Service Manual

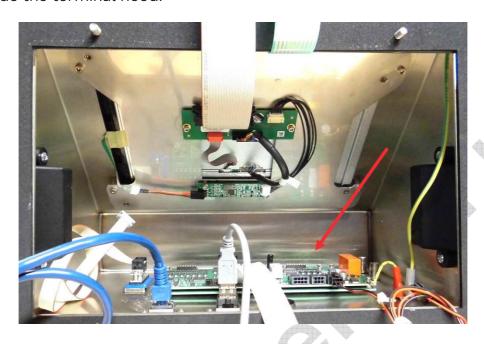
14.3 Connecting the power supply cables

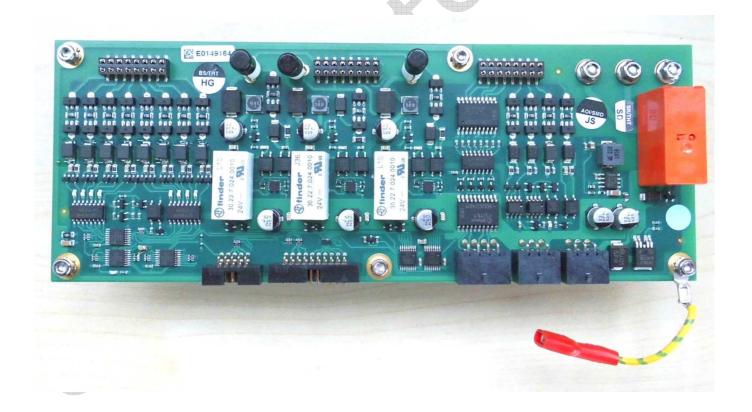


Coding Service Manual

14.4 IO board

Located inside the terminal hood.





Coding Service Manual

14.4 Exchange CMOS – battery (Base board)

CMOS-battery





Turn on the printer for 5 minutes \rightarrow therefore execute a service start. After 5 minutes turn off the printer and replace the battery. Pay attention to the correct polarity \rightarrow the + sign (1) of the battery must be visible (on the top).

Coding Service Manual

15.Operation

15.1 Basics

The following prerequisites must be fulfilled for reaching the print ready status:

1. The ink pressure is correct

The pressure does not differ more than +/- 30 mbar from the target pressure (AJ5 X 55 μ m = 3,000 mbar, AJ5 X 70 μ m = 2,500 mbar, AJ5 SP 42 μ m = 4,000 mbar, AJ5 HS 50 μ m = 4,300 mbar)

2. The viscosity measurement is running – the visco value is in the range +/-25 Default visco offset is adjusted;

The cross at visco top and visco bottom must periodically appear and disappear

3. The position of the ink beam inside the gutter is correct

Central adjusted, near to front side of the gutter

A distance of beam width 1-3 at 70 µm-nozzle and 3-5 at 55 µm-nozzle to the front side of the gutter

4. The ink flow (reflow-) value is big enough >250, normally at 350 - 450; the ink must not be too old

- 5. HV-, charge- and detection electrode as well as the gutter are clean
- 6. Drop separation (modulation) is correctly adjusted to the point of reversal
 - 7. Determination of charge moment worksin phasing menu, automatic phasing is running
 - 8. Print ready status (green Ready-LED burns)

Coding Service Manual

16. Wiring examples

16.1 Components overview – connectors



Α	Mains power supply	6	connection Serial RS-232 COM1
В	Compressed air max. 0.2 bar (6/4mm, optional)	7	Main switch
1	Alarm output	8	Signal stack (status indicator optional)
2	I/O-socket (16-pole)	9	USB port USB 2.0
3	Product sensor / Encoder	10	connection Serial RS-232 COM2
4	Product sensor / Encoder	11	Network connection RJ-45 100 BASE-T
5	Remote connection		

Electrical data for power supply connection

Electrical Data		
Supply voltage AC	86 to 264	[V] (± 10%)
Power frequency	50 / 6	o [Hz]
Current consumption	Max. 0.5 [A] / 230 [V]	Max. 1.0 [A] / 110 [V]
Power cable (length)	2.5	[m]
UPS (uninterrupted power supply) option - only for the variant professional		

Coding Service Manual

16.2 Product sensor- / encoder socket

Pin assignment of a product sensor / encoder socket			
	1	GND (software switchover,	
	2	external/internal)	
1 7 5	3	Encoder channel A	
	4	VCC (software switchover	
	5	extern/intern)	
3 50	6	Product sensor input	
	7	Encoder channel B	
	Housing	Line shield	

- The machine is provided with two parallel sockets for the connection of product sensors and encoders
- It makes no difference to which of the two sockets the product sensor or the encoder is connected. Thus, it is also possible to forward the signals from one machine to the next (pay attention to the driver output of the sensors).

Note



To ensure trouble-free operation of the machine, it is vital to use **shielded** cables for the encoder / product sensor in order to prevent interference signals from developing.

If it is not possible to use shielded cables for the product sensor, the ground connector used must be connected to the connector housing.

Coding Service Manual

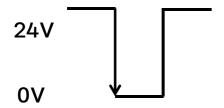
16.2.1 Installation instructions: Product sensor

Correct adjustment of the product sensor on the alphaJET to avoid printing offsets/errors.

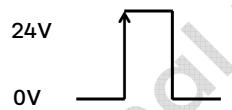
Determining the sensor type

There are essentially two electrically different sensor types:

NPN switching characteristic



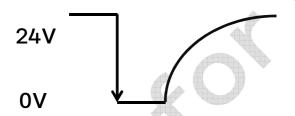
PNP switching characteristic



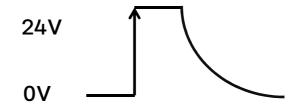
The sensor type is indicated on the sensor itself or on the data sheet. Some sensors are also adjustable. The sensor type indicates which switching logic the sensor works with, i.e. which edge is switched active when triggered.

Possible signal in practice (e.g. with a light barrier). First edge actively driven, 2nd edge floating

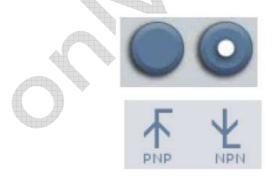
NPN switching characteristic

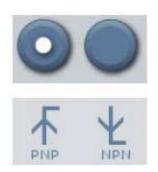


PNP switching characteristic



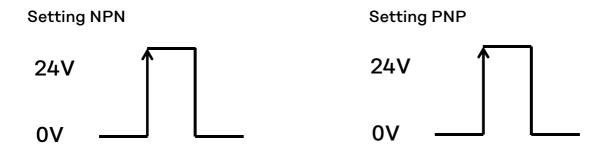
In the alphaJET, in the menu: Configuration → Basic; the correct type has to be selected.





Coding Service Manual

If the correct sensor type is set, the printer always operates internally with positive logic:



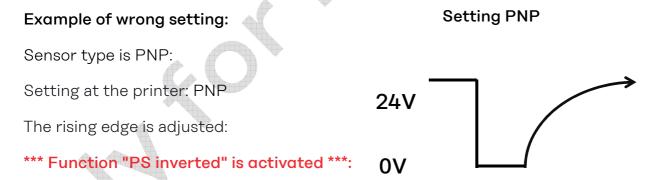
Attention: The setting **PS inverted must not be activated!** Otherwise both pictures above turn around and all subsequent settings must also be inverted (edge). The printer then works with inverted logic.

Setting the trigger edge

If the sensor is set **correctly** (PNP or NPN), **the rising edge in the device must always be set as the switching edge**.

Menu: Configuration → Installation.

Thus the printer always triggers on the driven edge of the sensor. This setting is important so that the printer can always print at the correct position. The switching time of the non-driven edge is not defined!



The printer inverts the signal and triggers on the edge not actively driven by the sensor:

The switching time is no longer defined, the position of the print image can "move" on the product.

Coding Service Manual

Push-pull output (e.g. from PLC)

If the product sensor signal comes from a PLC, it is often a push-pull output. This means that both edges are actively driven by the output stage of the sensor or the PLC.

It is important to select the correct edge for the print.

The setting PNP + rising edge selects the positive edge and as level the high level of the product sensor.

The setting NPN + rising edge selects the negative edge and as level the low level of the product sensor.

Basic instructions for installation/troubleshooting

- No matter where the sensor is powered from, it must be connected the 3 wires: GND, VCC (24V) and the PS signal.
- Check the fuses in the device.
- The LEDs on the motherboard can be used to check both the signal and the power supply.
- If possible use shielded cables and also check the correct contact of the shield.
- Always observe the data sheet of the sensor, especially in case of doubt.
- Check the type of supply (internal / external) and the correct connection of the sensor.
- Always check fuses if the supply type is incorrectly set.
- In the menu → Configuration → Basic: Set (increase) the debounce time in case of faults on the line.

Coding Service Manual

Product sensor signal

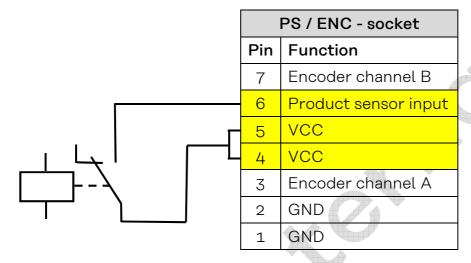
PS-signal internal

Internal power supply



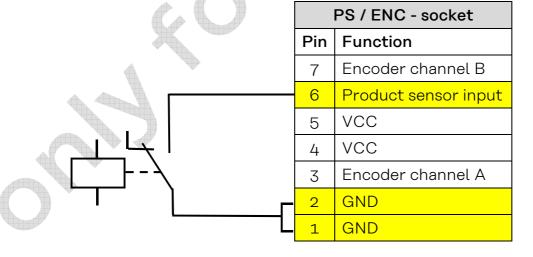
PS signal via potential-free relay contact, push-button or switch.

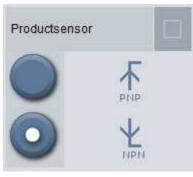
24 V from pin 4/5 via potential-free relay contact, push-button or switch to pin 6.
 Switching characteristic of PS-signal must be PNP.





O V from pin 1/2 via potential-free relay contact, push-button or switch to pin 6.
 Switching characteristic of PS-signal must be NPN.





Coding Service Manual

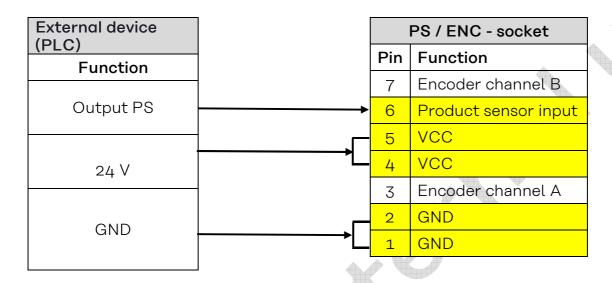
Product sensor signal

PS-signal external

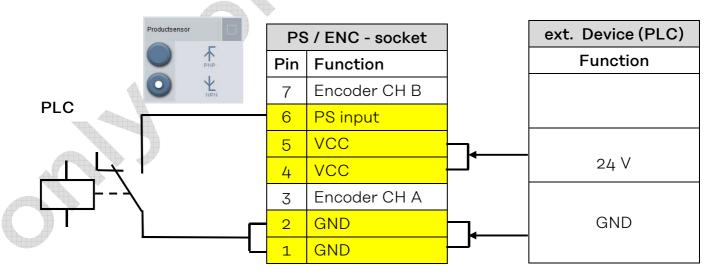
External power supply



24V external on pin 4 or 5, GND external on pin 1 or 2 and PS signal external on pin 6.
 Switching characteristic of PS-signal can be PNP or NPN.



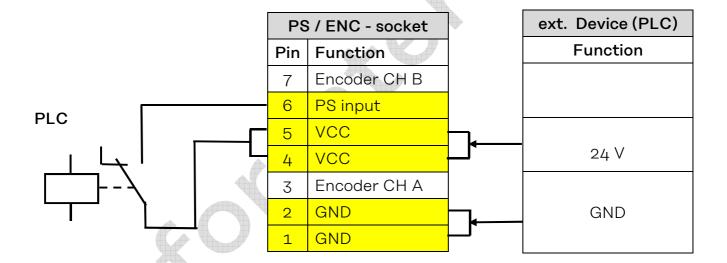
Or GND from pin 1/2 via potential-free relay contact of the PLC to pin 6.
 Switching characteristic of PS-signal must be NPN.



Coding Service Manual

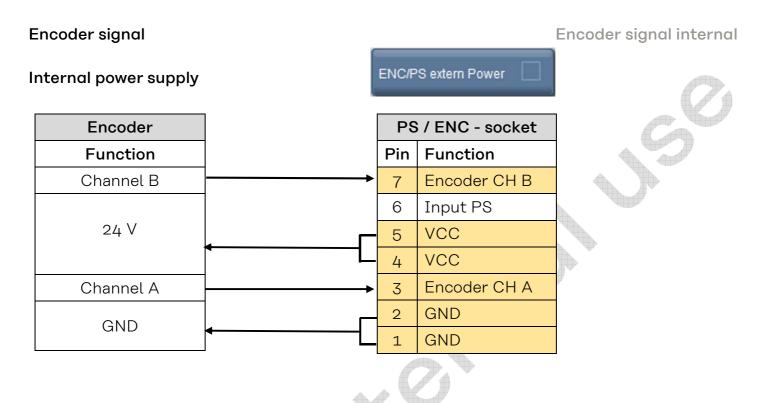
Or 24V from pin 4/5 via potential-free relay contact of the PLC to pin 6.
 Switching characteristic must be PNP.



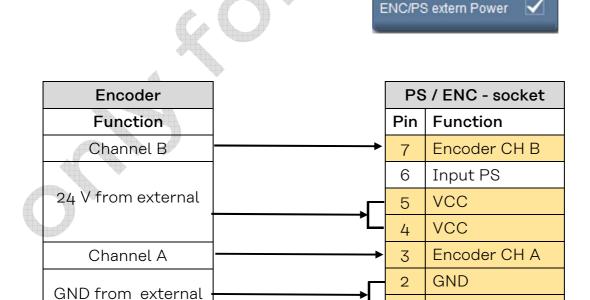


Coding Service Manual

16.2.2 Encoder



Encoder signal external



GND

1

External power supply

Coding Service Manual

16.3 Optional signal inputs /signal outputs

- The optional inputs and outputs can be used for extended communication with the machine on the machine level. The assignment of the signals depends on the print program selected.
- Here it is again possible to choose the DC-coupled connection to the "outside world" or to choose to have inputs and outputs electrically decoupled from the machine. In the latter case it must be ensured that the inputs can be configured independently of the outputs.
- The pin assignment can vary depending on the PrintControl program.

Note



To ensure trouble-free operation of the machine, it is vital to use **shielded cables** to prevent interference signals from developing.

If it is not possible to use shielded cables, the ground connector used must be connected to the connector housing.

- The signal for the inputs may be supplied by outputs with NPN switching characteristics (active at 0 V) or with PNP switching characteristics (active at 24 V).
- The machine's outputs are provided with PNP characteristics.

Coding Service Manual

Pin assignment of the IO socket				
Device socket	Pin	Designation	Function	
	1	OUTPUT_GND		
10 011	2	INPUT_7	Element selection (bit 2)	
12 10	3	INPUT_GND		
(3 13 16 9)	4	OUTPUT_0	Print	
4 14 15 8	5	INPUT_0	Reset WSM (distance measurement)	
5 • 7//	6	OUTPUT_1	Fill tank	
60	7	INPUT_1	Reset Print mark divider	
	8	OUTPUT_2	Ready	
	9	INPUT_VCC		
	10	OUTPUT_3	Alarm	
	11	OUTPUT_VCC		
	12	INPUT_2	Reset OPS	
	13	INPUT_3	Reset internal counter	
	14	INPUT_4	Reset text list	
	15	INPUT_5	Element selection (bit 0)	
	16	INPUT_6	Element selection (bit 1)	
	Housing	Line shield		

Coding Service Manual

16.3.1 Optional Signal inputs

Optional signal inputs internal

Inputs active Low

Internal power supply

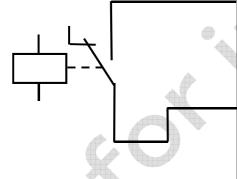


1. 24V-signal via **potential-free relay contact**, push-button or switch to an input. (Here as example INPUT_0, pin 5 Reset WSM).

Switching characteristic of input signal must be PNP.

	IO – socket	
Pin	Designation	Function
16	INPUT_6	Element selection (bit 1)
15	INPUT_5	Element selection (bit 0)
14	INPUT_4	Reset text list
13	INPUT_3	Reset internal counter
12	INPUT_2	Reset OPS
11	OUTPUT_VCC	
10	OUTPUT_3	Alarm
9	INPUT_VCC	
8	OUTPUT_2	Ready
7	INPUT_1	Reset Print mark divider
6	OUTPUT_1	Fill tank
5	INPUT_0	Reset WSM
4	OUTPUT_0	Print
3	INPUT_GND	
2	INPUT_7	Element selection (bit 2)
	 	

OUTPUT_GND



Coding Service Manual

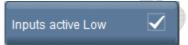
Optional signal inputs internal

Internal power supply

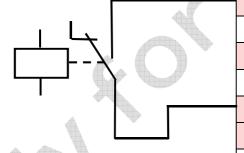


2. GND-signal via **potential-free relay contact**, push-button or switch to an input. (Here as example INPUT_1, Pin 7 Reset Print mark divider).

Switching characteristic of input signal must be NPN.



		IO – socket	
	Pin	Designation	Function
	16	INPUT_6	Element selection (bit 1)
	15	INPUT_5	Element selection (bit 0)
	14	INPUT_4	Reset text list
	13	INPUT_3	Reset internal counter
	12	INPUT_2	Reset OPS
	11	OUTPUT_VCC	
	10	OUTPUT_3	Alarm
4	9	INPUT_VCC	
	8	OUTPUT_2	Ready
	7	INPUT_1	Reset Print mark divider
	6	OUTPUT_1	Fill tank
	5	INPUT_0	Reset WSM
	4	OUTPUT_0	Print
	3	INPUT_GND	
	2	INPUT_7	Element selection (bit 2)
	1	OUTPUT_GND	



Coding Service Manual

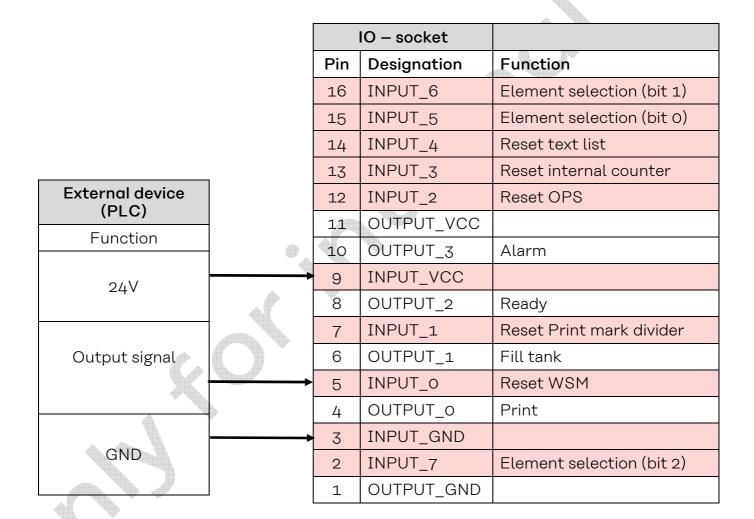
Optional signal inputs external

External power supply



1. 24V external to pin 9, GND external to pin 3 and input signal external to the desired input. (Here as example INPUT_0, pin 5 Reset WSM).

Switching characteristic of the input signal can be PNP or NPN.



Coding Service Manual

16.3.2 Optional signal outputs

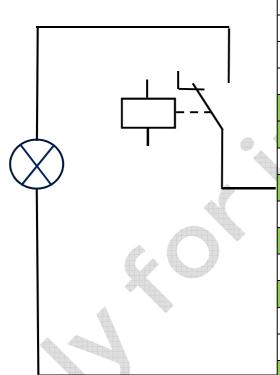
Optional signal outputs internal

Internal power supply



24V signal via potential-free relay contact, push-button or switch to a consumer. (here as an example OUTPUT_2, pin 8 Ready on a consumer).

Switching characteristic of the output signal is PNP.



	IO – socket	
Pin	Designation	Function
16	INPUT_6	Element selection (bit 1)
15	INPUT_5	Element selection (bit 0)
14	INPUT_4	Reset text list
13	INPUT_3	Reset internal counter
12	INPUT_2	Reset OPS
11	OUTPUT_VCC	
10	OUTPUT_3	Alarm
9	INPUT_VCC	
8	OUTPUT_2	Ready
7	INPUT_1	Reset Print mark divider
6	OUTPUT_1	Fill tank
5	INPUT_0	Reset WSM
4	OUTPUT_0	Print
3	INPUT_GND	
2	INPUT_7	Element selection (bit 2)
1	OUTPUT_GND	

Coding Service Manual

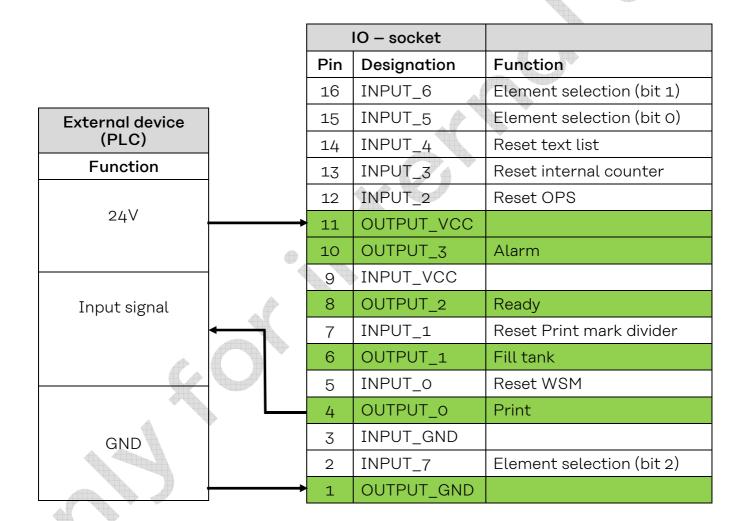
Optional signal outputs external

External power supply



24V external at pin 11, GND external at pin 1 and desired output signal. (Here as an example OUTPUT_0, pin 4 Print to external input).

Switching characteristic of the output signal is PNP.



Coding Service Manual

16.4 Alarm output

Alarm output

The device provides the changeover contact of a relay via the alarm output. The relay can be used as opener or closer (see pin assignment).

Device socket	Pin	Designation
	1	NO (closer)
(5) 6 (•)	2	C (middle contact)
	3	NC (opener)
4 03	4	PE

Technical data	
Load current:	1 A
Switching voltage:	230 V

